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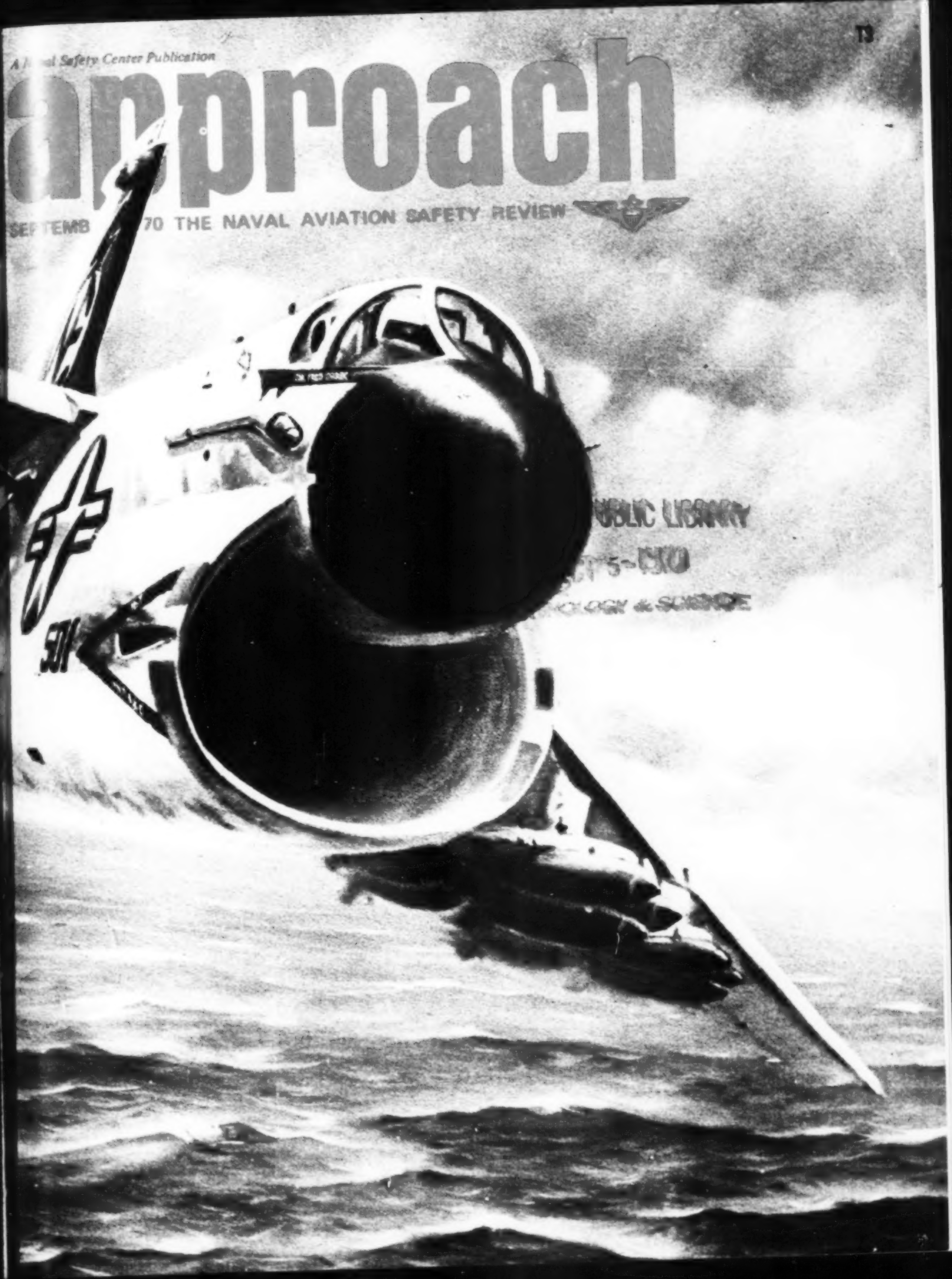
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MID-AIRS

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A Continuing Threat

IN FY-69 there were 16 major Naval and Marine aircraft accidents involving mid-air collisions; this was a slight improvement over FY-68 when there were 19 major accidents. However, considering that the airspace in which we operate daily grows more congested, it is obvious that there must be no letdown in our efforts to avoid such mishaps.

The Costliest Accident

Without doubt the most costly mid-air collision which occurred during fiscal year 1969 involved a KC-130F tanker aircraft (which was in the process of refueling two F-4Bs) and an F-4B on a separate and unrelated mission.

In this case, the flight of two F-4s was radar vectored toward the KC-130 by a ground control station. The KC-130 was maintaining 170 kias and was in the process of returning to home base. The tanker was notified that it had receivers in trail and increased speed to 210-220 knots. This was accomplished by adding power and initiating a gentle descent.

The receivers plugged in uneventfully (one on each side) and were in the process of receiving fuel while the KC-130 maintained a steady heading and a gradual descent. Altitude at this time was 19,000 to 20,000 feet.

Suddenly, another F-4B (on a separate and unrelated flight) collided almost head on with the KC-130 in the vicinity of the No. 4 engine and then passed over the top of the F-4B which was plugged into the starboard side of the KC-130, showering it with fuel and debris. After the colliding F-4B cleared the tanker it exploded into two major sections, fatally injuring both crewmen.

Immediately after the collision, the pilot of the F-4 which was plugged in on the starboard side of the KC-130F saw the starboard wing of the KC-130 disintegrate and the starboard horizontal stabilizer separate from the tanker. The KC-130 then rolled uncontrollably to the right over the top of the F-4 which was still plugged in on the starboard side. The tanker was then observed to be in a violent, tight spin in about a 45-degree nose-down attitude which continued until it crashed into the water below. There were no survivors.

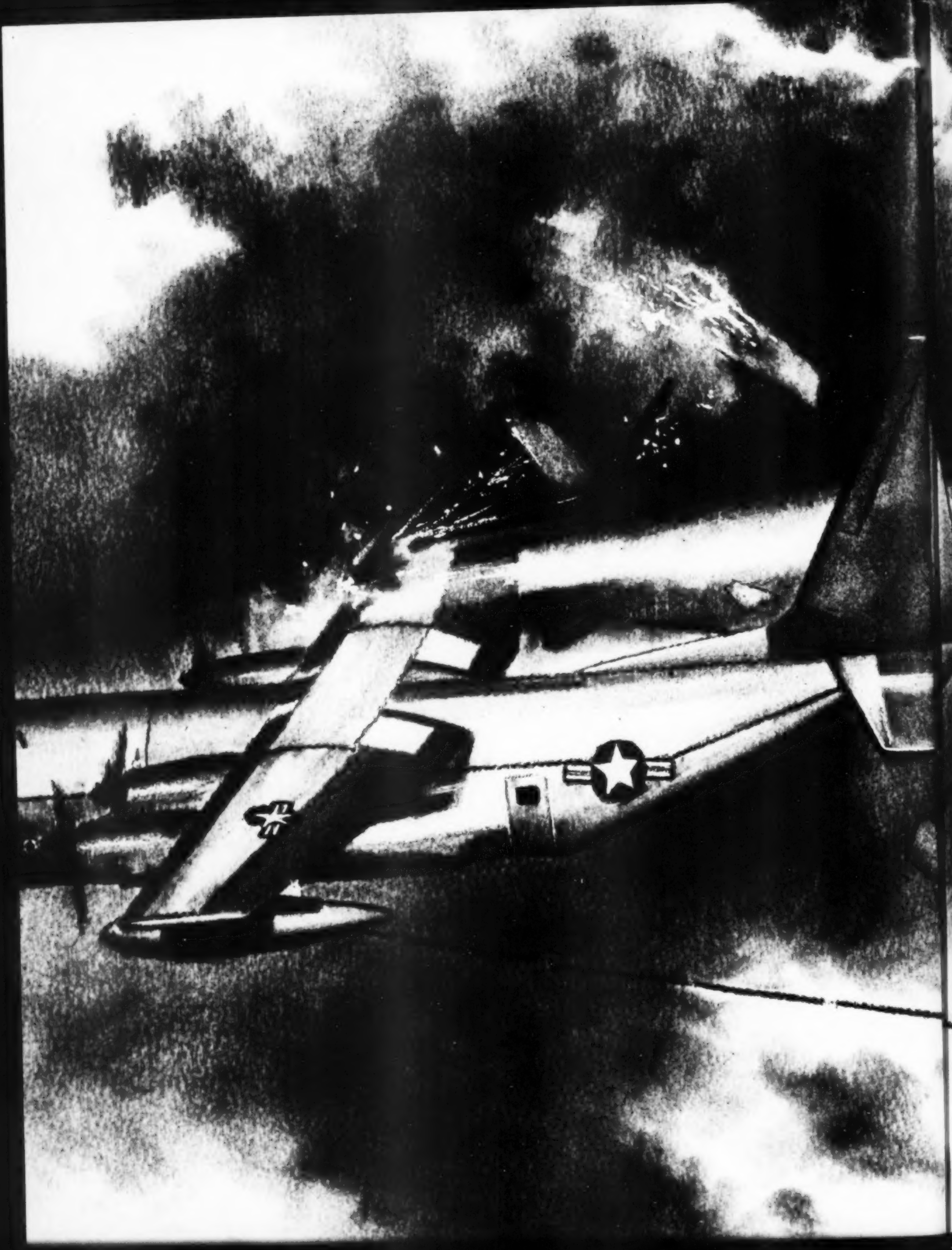
The F-4B which had been plugged into the starboard side of the tanker was flipped into the inverted position as the KC-130 went out of control. The drogue and a portion of the hose remained attached to the F-4. Fortunately, the *Phantom* pilot quickly regained control; however, neither engine would produce more than 72 percent rpm. The pilot was unable to move the starboard throttle and movement of the port throttle did not affect engine power. All external stores were jettisoned in an unsuccessful attempt to maintain altitude. Passing 2700 feet, the RIO ejected followed by the pilot at about 2000 feet. Both ejections were successful.

The other F-4, which had been plugged into the port refueling drogue, was disconnected from the tanker as it flipped into the spin and escaped with limited damage, resulting from the flying debris. A safe landing was made at home base.

The Most Probable Cause

Failure of the crews of the KC-130F and the colliding F-4B to maintain good lookouts appears to be the most probable cause of this accident. The investigation determined that the pilot of the colliding F-4 was on his second flight since arrival in the operating area. The Board noted the strong possibility that the RIO (who was very familiar with the area) may have been talking to the pilot and calling attention to various landmarks. The RIO's forward visibility is extremely limited so any landmark would have to be viewed out the sides of the aircraft. In this case the location of the collision (and aircraft heading) was such that several prominent landmarks could have been viewed out the port side of the single *Phantom.*

Through discussions with other KC-130 pilots it was also learned that the KC-130 lookout capability is somewhat decreased during refueling operations. The pilot concentrates primarily on the flight instruments

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and monitors the autopilot to ensure smooth flight while the copilot maintains a constant lookout for other aircraft. The flight engineer is primarily occupied with monitoring engine instruments and transferring fuel to receiver aircraft. The navigator assists the copilot in maintaining a lookout but he is in a poor position to effectively perform such duties. The two observers in the rear of the tanker concentrate on monitoring the receiver aircraft.

As for the two aircraft receiving fuel it is considered that most of the pilots' attention was concentrated on plugging in and maintaining proper position once hooked up. Therefore, their lookout capability was extremely limited. In this case the pilot of the aircraft receiving fuel on the starboard side of the tanker did see the oncoming F-4B but not in time to give any warning or take any corrective action.

Poor Lookout Figures in Another Costly Accident

Another costly mid-air collision involved a section of two F-8Js and a single F-4B on separate flights. The F-4 took off on a scheduled syllabus RIO training mission which included local area familiarization and a flight characteristics demonstration of the F-4B. The F-4 pilot completed the area familiarization portion of the flight and then proceeded to demonstrate stalls for his RIO.

The section of two F-8Js involved in the accident took off on a formation practice mission which involved parade formation, combat spread, tactical positioning and individual acrobatic maneuvering. Most of the formation work was completed and the section was proceeding in a combat spread at 300 kias when F-8J No. 1 passed the lead to F-8J No. 2. F-8 No. 1 then commenced a left turn to put his aircraft in trail from a position which was approximately one mile to the side, slightly forward of and 1000 feet higher than the new leader. During this turn, F-8 No. 2 called F-8 No. 1 and reported, "Aircraft between us." F-8 No. 1 increased his angle of bank to look for the aircraft and not seeing it anywhere on the left side, started to roll out of the bank and scan to the right. He immediately saw the F-4B at his two o'clock position, level and closing.

In the meantime, the F-4 pilot had completed one clean stall and was at about 150 kias in the process of demonstrating a gear and flaps down stall when his RIO called a bogey (F-8 No. 2) at 10 o'clock low. The pilot acknowledged the report with "Tally-ho" and commenced recovery from the stall by adding power.

Before the recovery could be completed, the other F-8 (F-8 No. 1) appeared directly in front of the F-4 in a left bank and slightly nose-high. The F-4 contacted F-8 No. 1 on the fuselage just aft of the trailing edge of the wing. The RIO later stated that he saw only the bottom side of the F-8 and never saw the cockpit. The nose cone and front cockpit of the F-4 were severely damaged on the initial impact of the two aircraft, incapacitating the F-4 pilot. The RIO lurched forward and then backward, pulling the alternate ejection handle on his backward movement. He later stated that there was smoke, fire and debris coming from the front cockpit as he ejected. The pilot remained with the aircraft and was lost when the F-4 entered a spin and crashed.

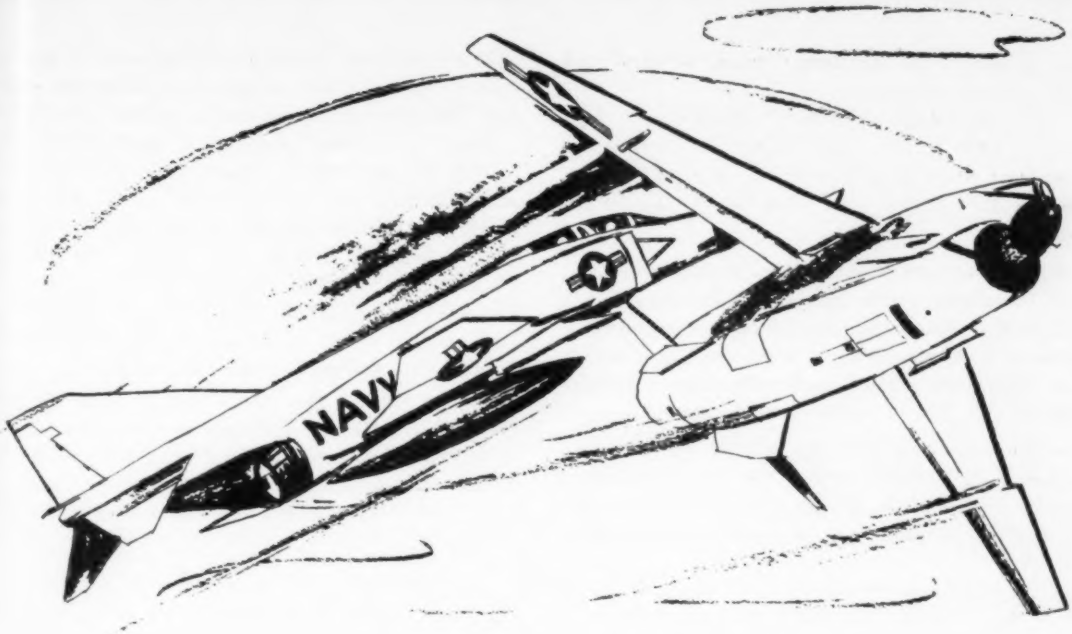
The pilot of F-8 No. 1, upon first seeing the F-4B at two o'clock, had pulled back on the stick in an attempt to go above the F-4 but was too late to avoid the collision. After the collision the F-8 pilot seemed to have momentary control of the aircraft but shortly thereafter it nosed over and would no longer respond to the pilot. He successfully ejected, suffering minor injuries. Later investigation indicated that the F-8J engine, vertical stabilizer, horizontal stabilizer, ventral fins and afterburner had come apart from the impact of the collision and landed in widely separated positions.

During the investigation of this accident it was determined that the F-8J which the RIO had sighted and reported to the F-4 pilot was not the same F-8 with which the F-4 collided. It appears that when F-8 No. 2 was sighted and reported by the RIO, the F-4 pilot may have become preoccupied with keeping it in sight while he completed his recovery from the stall. This, coupled with his nose-high attitude (which no doubt restricted his visibility) prevented him from seeing the other F-8J (F-8 No. 1) until seconds before the collision.

The F-8 pilot's lookout capability was also somewhat diminished. A minute or so before the collision he had experienced a minor lateral trim discrepancy. This diverted him momentarily to a head-in-the-cockpit condition. When he completed troubleshooting the discrepancy, the pilot looked out to the left to reacquire visual contact with his wingman. He then passed the lead to his wingman and started a left turn to reposition himself behind his wingman (the new leader). The net result of all this was that he diverted his scan from the right side of his aircraft for a considerable period of time and did not see the F-4 until it was too late to avoid a collision.

Mid-Air Collisions Between Aircraft in Same Flight

Mid-air collisions do occur between aircraft on separate and unrelated flight plans (as in the two accidents already discussed) but many mid-air collisions occur between aircraft in the same flight. ACM (air combat maneuvering), bombing practice and formation maneuvering are areas of relatively high risk. ACM involves rapid altitude changes, unusual attitudes and high closing speeds. In addition, there are times



when the aircraft are operating near the edge of controllability. All of these factors combine to limit the lookout capability of pilots and increase the risk of collision. Before engaging in ACM, all participants should be thoroughly briefed on the rules of engagement, particularly as to when and how the engagement will be terminated. Judicious use of radio calls during ACM can also be a significant safety factor. For this reason, ACM should not be engaged in unless all participants have established radio contact on a common frequency.

Lack of coordination between aircraft in bombing patterns has caused a number of mid-air collisions. The November 1969 APPROACH contained an article on page 18 about a mid-air collision between two A-7 aircraft which resulted from a failure of one of the pilots to adhere to the briefed rendezvous pattern.

Distraction at a critical time is a leading cause of mid-air collisions among aircraft engaged in routine formation maneuvering. In one such case two solo student pilots were practicing free cruise formation turns in T-28 aircraft when the wingman noticed he was closing on the leader. At that time he shallowed his angle of bank in order to go to the outside of the turn and gain nose to tail separation. As he went to the outside of the other aircraft he diverted his attention to the cockpit and checked his power setting. At this same time the flight leader rolled out of the turn. The wingman, preoccupied with checking the power setting, did not notice that he was turning into the leader until they collided.

The wingman's aircraft exploded upon contact with the leader and broke into two sections; however, the student pilot managed to bail out successfully. The lead aircraft was then observed in a descending left turn which continued until impact with the ground. The student pilot, who was in the lead T-28, remained with the aircraft and was fatally injured.

Mid-Air Collision Avoidance

There are many reasons for a pilot failing to see and avoid other aircraft. Here are the most important ones:

- *Cockpit preoccupation.* A conscious effort to improve pilot instrument scan will greatly reduce time spent looking inside the cockpit. High closure rates created by modern aircraft demand that considerable time be spent looking *outside* the cockpit during visual flight conditions. Crewmembers can greatly assist pilots, particularly if they are properly briefed on how to look, what to look for and how to report targets.
- *Factors affecting vision.*

(1) Fatigue – Adversely affects vision by slowing muscular action of the eyes (iris and external muscles).

(2) Glare – Overstimulates the eye and causes loss of sensitivity.

(3) High altitude – Hypoxia, when present, results in loss of visual acuity, constriction of visual field and difficulty in focusing.

(4) Space myopia – At high altitudes and with the absence of objects to focus on (horizon, clouds), eyes tend to focus at the windscreen or just outside the cockpit. Sighting distances are greatly reduced. Shift

gaze frequently to instrument panel, wingtips and distant objects (if available).

(5) Brightness/illumination inversion – At high altitude light comes more from the surrounding atmosphere than strictly from above, flooding the eyes. The cockpit appears quite dark in contrast to the outside.

• *Fixation.* A tendency for fixation must be avoided; scan in sectors, shift gaze vertically as well as horizontally. Practice focusing on objects of known or accurately estimable distances when available (this aids in avoiding fixation and in earlier detection of airborne targets).

• *Contrast.* Objects are more easily seen against contrasting backgrounds; in extremely low illumination, objects are detected almost entirely by contrast. Contrast or relative motion are the visual values which will most likely stimulate the eye. In dull skies, total airframe contrast is likely unless its color scheme blends with the background.

• *Reduced illumination.* Central vision is lost in light values less than moonlight; peripheral vision must be employed.

• *Positive G effects.* Reduces peripheral vision.

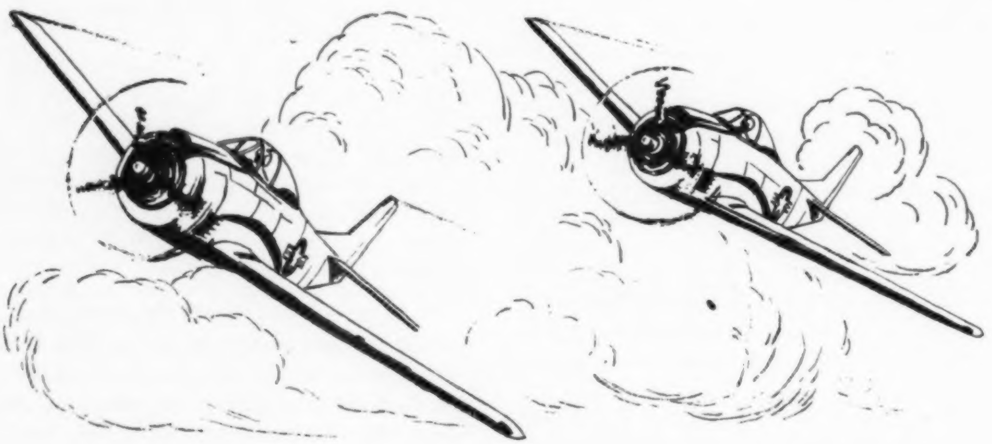
• *Turbulence.* In extreme cases can cause deterioration of vision. Prolonged flight in turbulence is fatiguing and lessens alertness.

Total time required to perceive and recognize an aircraft, become aware of a collision course and decide which way to turn may vary from as little as two or three seconds to as much as 10 seconds or more, depending on variables affecting the individual, types of aircraft involved and the geometry of the closing situation. Sighting distances are frequently as low as three to five miles and at today's airspeeds this leaves very little time to properly react to a threat of collision.

When a collision course is recognized (constant bearing) the pilot may not instinctively take the correct action. Turning to break the collision course or changing altitude will sometimes be the best solution. However, in some cases such actions may increase the hazard. Therefore, all collision situations that can possibly be conceived must be considered and planned for. Finally, evasive action should include maintaining visual contact with the other aircraft, if practical.

Don't assume an IFR clearance will provide separation, particularly when flying in and out of clouds or in visual flight conditions. Aircraft can legally fly VFR in one mile visibility outside controlled airspace.

A great deal of effort has been expended by the military and FAA to develop better rules, procedures and navigation systems to decrease mid-air collisions but much can be done by the individual pilot to reduce this hazard. Such individual efforts should include:



• Avoid areas of known traffic congestion such as student practice areas and airport approach zones.

• Use positive control when available and compatible with the mission.

• Know the hemispheric rules, particularly as they apply to VFR flight.

• Be especially vigilant in the vicinity of navigation aids and terminal areas (where a great many mid-air collisions occur).

Other factors which should be considered are terrain, proximity of airports, primary traffic flow and availability of air traffic control services.

The mixing of VFR and IFR traffic, particularly in

terminal control airspace, is a problem. The collision threat here exists between aircraft in transition (climbing, descending and changing speed or configuration) in addition to those aircraft in level flight. Keep in mind that controlling agencies are not always "skin painting" traffic but may be receiving beacon returns only. Also, most light planes are not beacon equipped and provide only a weak radar return, if any return at all. Remember, visual flight conditions place responsibility for collision avoidance on the pilot, even when filed IFR.

FAA Near Mid-Air Collision Study

Most readers are probably aware that the FAA conducted a study of near mid-air collisions in 1968 and 1969 but many readers may not be aware that this study has been extended through 31 December 1971. FAA Advisory Circular AC-00-23B states in part:

> "The Federal Aviation Administration is extending to 31 December 1971, inclusive, its 1968 policy that established the reporting of near mid-air collisions. This extension of the 1968 policy is considered appropriate since the final FAA report based upon the 1968 study has been completed and certain actions initiated to reduce the mid-air collision potential. In order to measure these actions as to effectiveness, it is deemed appropriate to extend this policy.
>
> "Accordingly, the Administrator will take no enforcement or other adverse action, remedial or disciplinary, against any person involved in a near mid-air collision that is reported to the FAA during the extension of this policy. This action is taken under his statutory mandate to promote safety in flight. Furthermore, the Administrator will, upon written request of the person making the report, withhold that report and the identity of those persons involved from public disclosure in accordance with Section 1104 of the Federal Aviation Act of 1958.
>
> "Therefore, it is the policy of the Federal Aviation Administration that if any pilot of an aircraft, air traffic controller or other person involved in a near mid-air collision reports the facts, conditions and circumstances thereof to the FAA:
>
> - "The Administrator will not subject any person involved in the near mid-air collision to enforcement or other adverse action, remedial or disciplinary, even though a violation of the Federal Aviation Regulations is disclosed by the report or subsequent investigation; and
> - "Upon written request of the person submitting the report, the Administrator will, to the extent authorized by Section 1104 of the Federal Aviation Act of 1958, withhold the identity of the persons involved in the near mid-air collision and the information contained in that report from public disclosure."

The FAA study is fully supported by the Department of the Navy. OpNavInst 3750.20 contains further details. Detailed information regarding FAA reporting procedures for pilots is published in the DOD FLIP (Flight Planning Document).

The Outlook

In addition to the near mid-air collision study, extensive efforts are being made by industry to develop effective collision avoidance systems and proximity warning indicators. These systems and devices are in various stages of test and development but it is unlikely that they will be in widespread use for a number of years. In the meantime, the most effective way to prevent mid-air collisions is to maintain a good lookout at all times while in flight. Keep your head on a swivel; *your* life depends upon it.

FAA Advisory Circular 90-48

The FAA issued Advisory Circular 90-48 on 20 March 1970 for alerting all pilots to mid-air collision and near mid-air collision hazards. This circular emphasizes those basic areas of concern, as related to human causal factors where improvements in pilot education, operation practices, procedures and techniques are needed to reduce mid-air conflicts.

It is recommended that all naval aviators read FAA Advisory Circular 90-48.

Short Snorts

Pilots seldom cause crashes when making wise passes.

Ham?

AT VARIOUS times in the career of most aviators an almost irrestible urge to show off overcomes good common sense with the result that in many cases an accident, without witnesses, occurs which seemingly defies solution, i.e. investigation determines that the power plant was operating, there was no problem with the controls, there was no fuel contamination or shortage of fuel, the pilots were current and qualified in model – result, cause undetermined. Probable causes may be listed with the usual things mentioned such as possible disorientation, possible hypoxia and possible this or that – everything, in fact, except *ham.*

Dieticians and other food experts tell us that of all the food stuffs we buy, cook and eat, pork is the trickiest. You know, trichinosis and all those "good" things. Uncooked ham is bad news both on the dinner table and in the cockpit. Gentlemen: *Curb the urge to be a ham.*

Some years ago an HTL pilot, operating as the OIC of a small detachment aboard an icebreaker, discovered in his efforts to relieve the boredom of ice RECCO day after day, that the helo made like a pretty good toboggan for sliding down the smooth, steep slopes of icebergs. He hammed it up whenever he had the chance, to the delight of the spotter flying with him. When he returned to the squadron at the end of the cruise, the entire rotor head, stabilizer bar and blades on his helo had to be replaced because of the undue stresses imposed. Catastrophic failure undoubtedly would have occurred if the helicopter had been flown much more. Pure, raw ham!

Recently the Army reported a fatal accident in a UH-1 as the result of an unauthorized maneuver – the pop-up. This maneuver is usually begun with a high-speed, low-level run followed by rapid application of aft cyclic (and it's assumed some collective). The helicopter pops up about 300 feet and then the nose is rapidly lowered. During the entire maneuver the helicopter is operated in the "no-no" area of the height velocity diagram. This maneuver could result in an uncontrollable aircraft attitude with resulting structural failure or, with the natural tendency of the rotor RPM to bleed off and abrupt cyclic movement to lower the nose, severe mast bumping may develop. Also, airspeed in the maneuver is reduced so quickly that the helo, at the top, is in effect in a high hover situation with no chance of sufficient lift available to sustain altitude. There are other considerations equally as dangerous as those mentioned, such as the surprise this would be for the pilot of another aircraft cruising overhead to suddenly find himself sharing the same airspace with the pop-up bird and the fact that the pilot performing the pop-up maneuver is completely blind to the area above. Leave the pop-ups for the toaster to complement that well-fried side order of ham for breakfast.

NavSafeCen concurs with a recent ComNavAirPac message that the pop-up or other similar maneuvers are not to be accomplished in any UH-1 helicopter. These maneuvers are prohibited. – Ed.

Where There's Smoke . . .

IT HAPPENED in the forward baggage compartment of a C-54P aircraft but it very well could have happened aboard almost any aircraft equipped with a baggage hold.

While unloading baggage at the conclusion of a flight into a West Coast military field, one seabag was found with a three-inch hole burned through its canvas bottom and some clothing inside burned and still smoldering. No material or items in the seabag were capable of

self-ignition.

Investigation revealed that the after light in the baggage compartment had a charred and blackened shield. It was suspected that a combination of three errors occurred which created the cause of this near inflight fire. These three errors were:

- When loaded into the baggage compartment, the seabag had been jammed up against the shield of the light fixture.
- A light bulb of much higher wattage than called for by specifications was found in the light fixture.
- The baggage compartment light was inadvertently allowed to remain "on" during the flight.

The crew of this aircraft learned an air safety lesson, luckily without the need to experience an actual inflight fire. Flight crew, maintenance men and terminal personnel must always be alert, even for the little things; sometimes they hurt the worst.

It Always Pays to be Alert!

PROPER COMMUNICATION *and* coordination during all phases of the turnup procedure are vital; neither the pilot nor the plane director should assume each step is an automatic progression which requires only routine attention. Line personnel get pretty well shaken when an unexpected event takes place, especially if it compromises safety and it's *their* safety which is placed in jeopardy. The following is an actual occurrence which illustrates the meaning of this statement.

A C-1A was on the line, with the flight crew aboard and the line crew standing by to commence turnup. The man assigned to the fire bottle was positioned about two feet from the No. 1 engine and was looking at the cockpit while awaiting the signal that turnup was about to commence. Suddenly he became aware the prop on No. 1 engine had started to rotate; the pilot had initiated the turnup procedure without a signal to or from the plane director. Fortunately, no one was hurt by this unexpected event.

The event described reemphasizes that *nothing* should be taken as routine in aviation, that everyone connected with aviation must always be completely alert for the unexpected if injuries or worse are to be avoided. Line personnel must stand well clear of props or tailpipes and pilots must *always* establish two-way communications between themselves and the plane directors *prior* to initiating turnup procedures.

"Hey, fellows! Come on in the oil's great!"

Missed Again

TECHNIQUE, a technical method for accomplishing a desired goal, explains clearly what landing a UH-2 aboard a DLG is all about. The pilots of a UH-2 from a CVA helicopter detachment were sent over to a DLG between plane guard hops. The copilot, who was flying in the right seat, made an excellent approach but as he touched down the aircraft spun counterclockwise about 45 degrees. The tailwheel skipped off the flight deck, out over the flight deck safety net and the empennage came to rest on bitts at the deck edge. Two passengers were discharged and the aircraft commander, in the left seat, attempted a vertical ascent but as the helicopter lifted, the tailwheel dipped and caught the guy wire of the net frame which then raised up and struck the airfoil section of the tail pylon. The helicopter rapidly commenced an uncontrollable pitch up and simultaneous left roll until, fortunately, the tail strut pulled free. The aircraft commander was then able to return to the CVA and land. Damage to the helicopter consisted of displaced skin, a slightly buckled frame and a bent and distorted tail pylon angle.

The yaw had been caused by a sudden reduction of torque without compensating rudder before the helicopter was solidly on deck. One endorser of the incident report made two excellent points:

- The absolute necessity for careful and precise control of a helicopter landing in confined areas cannot be overemphasized. Less than perfect technique can result in tragedy.
- The helicopter should have been shut down and the damage assessed before attempting a takeoff.

HONEST ASSESSMENT

"PRIOR to this deployment I had given considerable thought to ejection situations and felt reasonably confident that I could cope with them. However I had not given the same attention to the postejection situation. My reasoning went thusly: If I were unconscious or irrational after ejection, I would be unable to help myself anyway. If I were rational I knew essentially what had to be done and could figure out any necessary variation on the basic theme. In retrospect, the lack of logic and incompleteness of this thinking is apparent. Some actions should be reflexive to the point that they can be performed in a state of semiconsciousness, shock, panic or all three."

The pilot whose honest assessment you have just read was rescued from the water after having ejected following an unsuccessful catapult shot.

At approximately 1640 the pilot taxied onto the No. 1 cat for his fourth catapult launch during afternoon carquals. Positioning on the cat was normal and engine runup was commenced on signal to take tension. No discrepancies were noted by the hookup crew and a thumbs up signal was given to the catapult officer. After completing his required checks and receiving a salute from the pilot, the catapult officer gave the signal to fire.

"This cat shot felt normal for about the first 10 to 20 feet of the stroke," the pilot later recalled. "At that point I felt something break or give way sharply. The aircraft swerved left about 15 degrees and stopped accelerating. I depressed both brake pedals hard and sometime prior to reaching the ship's bow, moved the throttle to idle. With about 75 feet of deck remaining, it seemed certain that the plane would go off the bow. I looked and felt for the secondary ejection handle, found it, moved my head and shoulders back and pulled. The ejection sequence started with a loud bang and upward acceleration that lasted a little longer than the sound.

"Ejection was violent but bearable. I felt that I traveled straight up, then began to tumble slowly backwards. I was not aware of seat separation. Chute opening shock was moderate. At this time I found that I could not breathe and felt as if the breath had been knocked out of me. I unfastened the right side of my mask but that didn't help much. I reached for the Mk-3C toggles, saw the plane's tail and the ship close by and entered the water feet first, then hit on my back and right side.

"At water entry I sank one or two feet below the surface, came back up and reached for the Mk-3C toggles again. The chute was about halfway inflated and dragging me slightly. I tried to collapse it but pulled on the wrong riser – the top one. When I let go of it and began looking for the bottom riser, the chute collapsed of its own accord. *(Canopy deflation pockets had been installed per Clothing and Survival Equipment Change 5. – Ed.)*

"I had difficulty locating the koch fittings. When I did find them, they looked upside-down. I used both hands and they came open easily. Even though my gloves were wet and halfway off my hands, they did not cause problems at any time.

"One shroud line was wrapped around my right wrist and I removed it. I thought several more lines were wrapped around my left ankle but I couldn't kick or pull them off. For the first time I noticed the helo standing about 50 yards off. I thought he was waiting for me to get clear of the chute. I started for my shroud cutter but couldn't remember where it was and so began swimming away from the chute.

"I wasn't making much headway and had started looking for the shroud cutter again when I saw the rescue aircrewman who had been dropped from the helo. He asked how I felt. I said that I thought I was all right but that my left foot seemed to be tangled in shroud lines. He went under, came back up and said that the foot was free. He went back under and released the seatpan rocket fittings. Then he surfaced again and said, 'That hose will have to come off.' I assumed he meant the oxygen hose so I released the mask/seatpan connection."

The helo crewman did not know how to release the hose to the bailout bottle in the seatpan.

"Fortunately, the survivor was only showing signs of mild shock," the crewman reports, "and when asked, released his own hose so the seatpan could sink."

"The two of us swam away from the chute and stopped about 20 yards from it," the pilot continues. "The helo began its approach, then stopped. It looked as if we were close to the chute again so we swam away and then the helo came in the rest of the way. The swimmer connected us both to the hoist and we were winched up. The ride back to the ship was uneventful except that I became aware of a slight pain in my back."

The pilot had sustained a minimal compression fracture of a thoracic vertebra. He was hospitalized one day and was off flight status a month. Investigators stated that the pilot's difficulty in reaching the alternate ejection handle prevented optimum positioning for ejection. Aircrew Systems Change 139 of 16 May 69 provides a longer, flexible, alternate ejection handle

which improves accessibility. However, this change, which has an 18-month compliance period, had not yet been incorporated in this particular squadron's aircraft at the time of the accident.

"I have flown with two types of ejection seats which had several modifications to each," the pilot continues. "In every case the secondary firing handle has been so far down and forward that I could not get a good grip on it while maintaining optimum body position. *(The pilot is 6 feet 2 inches tall.)* In some cases, depending on the type of seat pack installed, I could not reach the handle at all from that position. I estimate that at least one-fourth of all other pilots experience the same difficulty. It is my opinion that the low, forward position of the secondary handle is at least a contributing factor to back injuries. Therefore, in a controlled ejection, regardless of airspeed or altitude, I favor use of the face curtain because of body positioning. However, for quick-reaction ejection situations, I would like to see the alternate handle used as the primary ejection control and the face curtain designated as the secondary control to be used only at high airspeeds."

Commenting on the postejection period the pilot states, "The pilot's part in the emergency is not over until he is inside the helo. Deep water survival training had given me an accurate idea of what to expect while in the water with one exception: I was not prepared to look for the koch fittings while the risers were slack, underwater and somewhat twisted."

Investigators were of the opinion that the pilot's actions were timely and correct under the circumstances. The most probable cause of the accident, they said, was slippage of the bridle after tensioning although no definite conclusion was made. (After extensive investigation, the C.O. of the carrier thought that the probable cause was material failure of the aircraft's port catapult towing hook.)

The fact that the pilot was forced out of proper ejection position while reaching for the alternate ejection handle possibly contributed to his injury, the Board said. In addition, his lack of familiarity with the location of his shroud cutter might, in other circumstances, have affected survival; however in this case it was not a significant factor. Although the pilot was conscious and able to provide assistance, the fact that the swimmer was unfamiliar with the oxygen hose connection was less than desirable.

Recommendations

The Board's recommendations in the area of ejection and survival were:

- Aircrew Systems Change 139 should be incorporated in all A-4 aircraft as soon as possible. The longer alternate ejection handle this change provides will allow all pilots to remain in proper position for ejection.
- All pilots should review their personal survival equipment periodically to insure familiarity with survival items carried and their location.
- All helicopter rescue teams should be completely familiar with rescue procedures for any aircraft flying from the ship for which they are providing services. A definite effort must be made to have rescue personnel briefed prior to any air operations.
- Some type of oxygen mask fitting which does not require use of fingers for release is highly desirable. Possibility of mask removal in case of broken hands or fingers is considered remote.
- Special emphasis on postejection procedures during ejection seat training.

The skipper of the carrier was on the bridge during the carrier landing qualifications and refresher landing practice and observed the accident. "The pilot handled his aircraft in a very professional manner and exhibited coolness and excellent judgment in a situation of great stress," he later stated.

On the subject of learning from experience of others, the squadron commanding officer wrote: "Firsthand reports of successful rescue operations are, in themselves, very valuable. The pilot has been given the opportunity to pass on his postejection difficulties to fellow pilots. This method of learning from another man's mistakes is considered very effective in providing emphasis on postejection procedures and will be continued whenever possible in the future." ◄

To LOOK is one thing.
To SEE what you look at is another.
To UNDERSTAND what you see is a third.
To LEARN from what you understand is still something else.
But to ACT on what you learn is all that really matters.

Safety Review

Is it Loaded?

CASUAL users of aviation ordnance generally have an overly cautious respect for the material which they are using. Some daily users of aviation ordnance frequently disregard general safety precautions, almost to the point of disdain. Somewhere between these extremes are the great majority who follow checklists and religiously observe good safety practices and procedures.

Within the aviation community, squadrons operating in Vietnam are doing most of the shooting and bombing these days. It is expected, from their extremely heavy firing activities, that they have had their share of misfires, jammed guns, cookoffs and other strange happenings.

The crew of one aircraft was "on patrol" one day when one of the gunners spotted a target of opportunity which needed to be silenced. The pilot rolled in for attack with his miniguns blazing. At some point in his attack the left minigun jammed. Later, after landing, the ammunition chutes and safing sector were removed and the minigun was unjammed. The feeder-delinker was cleared and no ammunition was present there. The ordnancemen then went to work to reassemble the gun for the next flight. A crewman straddled the gun and rotated the barrels manually to position the bolts so the safing sector could be reinstalled. As the safing sector was about three-fourths of the way installed, the gun discharged a round. Why? (The manual, TM-9-1090-202-12, says the weapon is supposed to fire only when the safing sector is installed.) One round had chambered during the jam and was overlooked during the clearing and cleaning operation. It just happened to be in the barrel at the firing position so that as the safing sector was installed it cammed the bolt forward. The minigun then proceeded to function as if it had been ordered to fire. (Talk about Russian roulette!) A multibarrel gun must be checked as if each barrel were an independent weapon (which in a sense it is) in order to preclude similar incidents in the future. When you clear a double-barrel shotgun you remove the shells from both barrels – right? Fortunately there were no personnel or other aircraft in the line of fire. Squadron SOP requires pilots and ordnance personnel to keep the area in front of miniguns clear and to keep the guns pointed either into the revetment or on a clear bearing.

About two weeks later a pilot turned up another aircraft for a weapon system electrical check. Two gunners, an instructor and a trainee, were performing some on-the-job training during the system check. Upon command the trainee actuated the trigger and the minigun fired. Both gunners had safed the gun but both overlooked one chambered round. *Aw, now fellows, come on!* That's twice in a very short period when the gun that was thought to be safe went off. Again, no personnel injury or damage was incurred.

There is one sure, safe, sane way to avoid this type of incident. Use the Conventional Weapons Checklist/Loading Manuals/Stores Reliability Cards/NATOPS Manual, not just to satisfy inspection requirements but as if your life depends on it. It does. These documents are designed to enhance safety and reliability of airborne weapons/stores and are the result of extensive research and fleet experience. ◄

PSYCHOLOGY as

BETTER than half of all naval aircraft accidents are caused by human error and about 20 percent of these involve personnel other than the pilot. Many of these human error accidents which result in personal injuries and deaths occur on the flight line or within squadron spaces. A reduction in this type of occurrence would obviously improve operational readiness significantly.

Application of psychological concepts to all hazardous squadron activities can help bring about such a dramatic reduction in human errors. Prevention of aviation mishaps can be approached from two directions. One involves designing aircraft systems to be more compatible with human operators. (This includes aircraft servicing and maintenance systems as well.) The other involves modifying human behavior to eliminate error through the use of psychological principles.

Psychological Principles

The psychological principles that apply to a safety program within a squadron include safety communications, motivation for safe performance, learning theory as it relates to safety education and integration of safety functions into the whole squadron organization.

It must be emphasized that there are no magic formulas or instant panaceas for the solution of accident problems. In the final analysis, prevention of accidents is a total squadron endeavor. Efficient squadron management – with all that the term implies – is synonymous with safety. If all departments within a squadron organization are effectively functioning as integral parts of a total system, then it logically follows that accidents will be reduced.

A question arises at this point: If safety is the concern of everyone in the squadron, then why should only one person be designated safety officer? Safety officers are required to provide safety education

The Focus is

as an Aid to Squadron Safety Programs

on the Individual

throughout the command as well as to insure that safety standards and procedures are incorporated into all squadron functions. Other equally essential tasks are those of translating data concerning accidents and mishaps into useful and meaningful information for squadron use, monitoring the existing environment for hazard potential and keeping the command advised in matters concerning safety and accident-free operations.

Communications

The safety officer's major task is to create accident-free behavior. To do this he must establish adequate communications within the squadron. There are two basic facets of communication: face-to-face interchange and mass communications. Mass communications are concerned with total squadron performance whereas face-to-face communications are useful in passing information down through the various channels, arriving finally at the individual.

Here are three principles for mass communications:

1. Lines of communication should be as direct and short as possible.

2. Communications must be based on confidence in the communicator.

3. Communications should be complete and continuous.

Successful communication does not occur automatically when a message is imparted because:

- A person often hears what he *wants or expects* to hear.
- He may ignore information that conflicts with what he already knows.
- The source of the message is a determining factor in how it will be accepted.
- If a person rejects part of a message he probably will reject all of it.

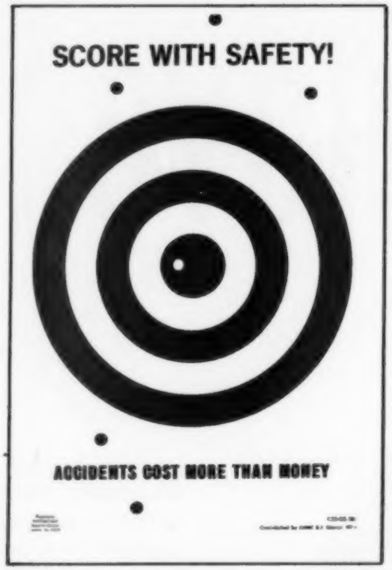
Continued

• Interpretation is dependent on each individual's prior experience.

• Words may mean different things to different people.

• Vague messages often prompt feelings of insecurity and may thus be rejected.

Safety information must be geared to the group at which it is aimed and the source should be related to the group receiving the message. Messages should be reasonable and not unduly demanding. They should contain specific requests and give specific procedures for carrying them out.



Visual Information

Visual information should be presented in a positive vein to be effective. Negative pictures, such as bloody photographs of mutilated bodies, can create fear without imparting any information concerning appropriate action. This may lead to avoidance of all future safety messages by the individual in whom fear is aroused. If safety messages such as posters do not indicate the exact condition of danger and why it should be avoided, these messages do little more than rouse anxiety. This negative connotation also applies to verbal and written information.

Here are some basic principles to follow in providing maximum impact for your visual safety messages:

• Visual messages should be placed in locations where people are most likely to look at them.

• They should be relevant to activities engaged in by personnel located in spaces where they are displayed.

• They should be removed when their effectiveness is exhausted (three months is considered maximum).

Safety mass communications are most effective when they support an active safety program. Such communications should be presented in a planned sequence to support specific aspects of a safety program. *Repetition* leads to retention. Immediate benefits attract more attention than long-range goals and the familiar is grasped more quickly than the unfamiliar. For instance, posters should link new ideas to accepted safety procedures. Objectives should be limited so they can be readily absorbed. Try to get some feedback on the impact of safety communications within the squadron.

Motivation

Motivation is "getting people to want to do what you want them to do." Motivation in a positive sense means a strong commitment of the individual to the squadron's objectives. It is manifested by a high esprit de corps and expressed by individual creativity. Lack of motivation leads to low productivity and conflicts between men and their supervisors; it can ultimately lead to high accident rates. Motivation is both subjective and objective. The subjective aspects are known as needs or desires. Objective aspects, coming from outside the individual, are known as incentives or goals.

Safety as a goal in itself is undramatic and of little value as a sole incentive. In addition, safety procedures may be perceived by the individual as interfering with his ability to complete a job rapidly. An individual may react negatively to wearing protective clothing such as helmets or safety glasses because of physical discomfort or marring of self-image.

Motivation involves determining needs and desires of individuals and providing incentives for those desires which will result in achievement of the squadron's objectives – in this case, reduction of accidents. By achieving incentives, the individual will satisfy his own personal needs and drives as well as those of the squadron as a whole. Man's most basic drives are for self-preservation (security) and group acceptance. These can be used to provide a powerful incentive.

Successful Motivation

Successful motivation consists of determining a man's needs, selecting and implementing appropriate incentives to meet

those needs (as well as those of the squadron), establishing reasonable tolerance limits within which the man can achieve those incentives, assessing the effectiveness of incentives and taking corrective actions, if needed.

The subjective motivation approach is best where opportunities to achieve desired satisfaction are provided within the job itself. For this purpose the command should provide an environment which includes acceptance, knowledge of where one stands, a reasonable autonomy for the individual and freedom to practice his skills. Achievement of this approach can be made easier for squadrons through the use of:

- Rewards (official recognition, praise).
- Immediate benefits (short-range objectives rather than long-range ones).
- Reciprocal interest.
- Objectives commensurate with abilities of the men and relevant to their activities in the squadron.
- All hands participation and involvement in the program (familiarity can enhance motivation).
- Opportunities for each member of the squadron to express his ideas or viewpoint. Punishment (discipline) is a poor motivational tool because avoidance behavior and hostility towards the safety program will usually result.

Safety Education

"Training" relates to acquisition of skills. "Education" refers to the incorporation of knowledge, skills and attitudes into a person's behavioral repertoire and carries with it the connotation of thinking. A man should be educated to think about safety in all of his activities but safety education is essential to on-the-job training.

Principles of Learning

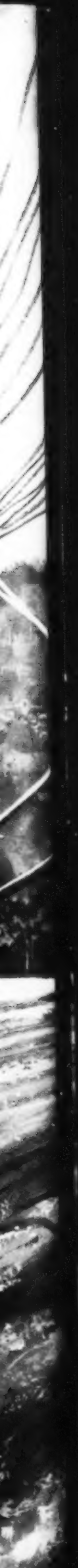
Learning is a change in the individual's behavior which results from his interaction with his environment and, hopefully, makes him more capable of dealing with it. Learning should have a specific goal, involve action (experiencing, doing) and be realistic. It will proceed best when there is an immediate feedback of results.

Learning and achievement are affected by the individual's level of aspiration. Learning is strengthened by repetition; it produces patterns of action, values, attitudes and skills which are functionally interrelated. Learning of some skills is rapidly incorporated into the learner's behavior; other skills are incorporated more slowly and gradually. Appropriate responses should be positively acknowledged or the response will be rejected or modified. Acquired knowledge and skills can be transferred to new tasks if the individual can discover relationships for himself as he learns and if he has experienced the application of principles which fit the tasks he is learning.

Safety education must be integrated into all levels of squadron training and operations; such a program requires continuity and long-range planning in which the Division Officer is key. A vital segment of this integration process involves efficient application of psychological principles and concepts to safety management.

(This article was adapted from a paper entitled "Psychology in Safety Management," by Dr. Francis McGlade, which initially appeared in the SAE Journal, November, 1967. Dr. McGlade is Chief of the Education Branch, Safety Division, Department of the Army, Washington, D.C. Dr. Robert Alkov, who prepared this material for APPROACH, is a former naval aviator and is currently Head of the Behavioral Sciences Division, Life Sciences Department, Naval Safety Center.)

The man who is wrapped up in himself makes a mighty small package.
WCPK, Chesapeake, Va.



In Extremis

AFTER a mid-air collision somewhere between 7000 and 9000 feet, at 210 knots, the pilot of an A-7B didn't think his ejection seat could save him *but it did!* Here is an excerpt from his narrative:

"INITIALLY, I felt my port forward windscreen had exploded, striking and breaking the left half of my helmet visor. My reaction was to try to get the aircraft under control and to decide if positive control was possible. Then I reacted to the continued uncontrollability and to the fire flow over my left shoulder and I pulled the alternate ejection handle with my left hand. At this point, as I was flailing around the cockpit and reaching for the ejection handle, I felt my *extremis* situation was too great for the ejection seat to save me.

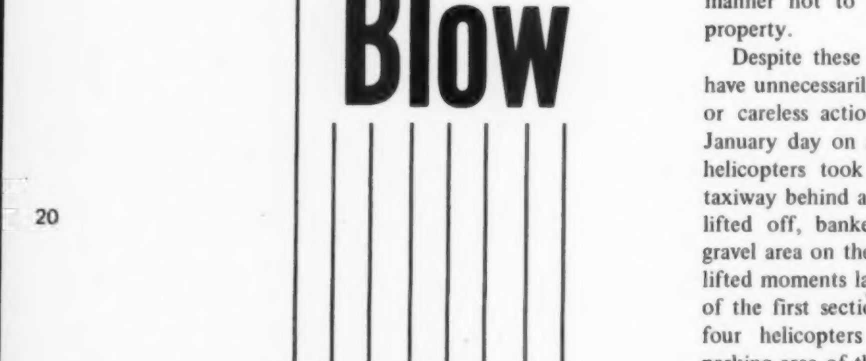
"After I pulled the alternate handle it seemed to take forever for the seat to travel up the rails. I estimate my body position at time of ejection was slightly hunched forward, oxygen mask knocked off by a portion of the windscreen, feet on rudder pedals and right hand on the control stick. As soon as the chute blossomed, I looked back over my left shoulder to see what appeared to be one large fireball and two or three other good sized pieces of aircraft descending to earth. At this time I diagnosed my problem as port forward windscreen implosion, followed by loss of control, violent rolling and yawing gyration and internal explosion rather than mid-air collision.

"As I was descending I noticed I was rapidly drifting to the southeast. I grabbed my shroud cutter which had fallen out of my SV-2 survival vest on ejection and I began thinking about my landing wind problem. My next reaction was to get a few gulps of the seat pan oxygen and assess my physical condition. I found no body damage so I positioned my hands on the koch fittings and prepared for touchdown. By pulling on the risers I was able to turn about 45 degrees to the left of my drifting descending path. I touched down in a plowed field, hit feet together, then onto my right knee, shoulder and helmet. At initial touchdown I unlocked the koch fittings by pushing the latches up but it was two to three seconds later before I completely released first the right shoulder fitting and then the left. After the chute was disconnected I freed myself from my seat pan and began to gather up my chute. A man came running across the field and assisted me in carrying my equipment and chute to his automobile. We then drove about 300 yards to a house where I called the squadron SDO and informed him of my location and condition.

"The escape system seemed to work properly from the firing of the alternate handle to chute blossom. I had no jolt sensation as I started up the rails. I did hit both legs about five inches below the knees during cockpit exit. I have no recollection of any snap or real jolt as the chute blossomed. I did not attempt to beat the seat separation and parachute deployment. I feel strongly that my visor and oxygen mask saved me from incapacitation at time of windscreen implosion."

On the Beaufort scale No. 10 is described as Whole Gale with wind velocity between 55-63 mph and the additional description of "trees uprooted; considerable damage occurs." That much wind can be described just as well as:

The Big Blow



WHEN helicopters are preparing for takeoff, approaching for landing and landing they are distinct hazards to ground personnel, other aircraft and property because of the potentially destructive windstorms created by the rotor blades. OpNav Instruction 3710.7E, General NATOPS, establishes general requirements for helicopter routes and altitudes around airports and minimum clearance distances from other aircraft, buildings or obstacles. Local Air Operations Manuals usually are quite specific, complete with course rules, diagrams and other information with regard to helicopter operations around the field. Helicopter landing and takeoff zones are clearly spelled out and in any case helicopter operations must be conducted in a manner not to endanger personnel, other aircraft or property.

Despite these regulations, helo pilots time and again have unnecessarily caused untold damage by thoughtless or careless actions. For instance, one beautiful, clear January day on a major Pacific island base, four large helicopters took off in two sections from a parallel taxiway behind a line of F-8 aircraft. The first two helos lifted off, banked right and passed over a stabilized gravel area on their departure route. The second section lifted moments later and duplicated the departure route of the first section. The resulting rotor wash from the four helicopters completely covered the ramp and parking area of the fighters with small rocks and gravel. Five F-8 aircraft incurred varying degrees of FOD. One F-8 required tail section and afterburner removal and all of them had to be vacuum cleaned and carefully inspected – about 150 unnecessary man-hours were expended to clean up the mess. The helicopter pilots had been cleared for takeoff by tower personnel who were unaware of the existing potential FOD area. The pilots, however, were in a position to see the dangerous condition but it either did not register or they ignored the gravel area and blithely proceeded on their way. Just in case there are any readers who question that the clearance granted by the tower operator relieved the pilots of any responsibility, such as occurred in the cited

incident, perish the thought! Aircontrolmen are charged with the responsibility for safe and orderly flow of traffic and ensuring compliance with rules and regulations established by the Commanding Officer of the facility. If there is no conflict with airport traffic and a pilot requests any deviation the tower operator may grant it "at pilot's discretion" whether the words are used or not. Tower operators are quick to point out any unsafe requests, if they are known, but may still grant a request if the pilot insists.

Two recent articles have been published in APPROACH (Rotor Wash Hazards, Oct 1969 and Helicopter Rotor Blade Vortices, Jan 1970) emphasizing the dangers created by those big, whirling rotor blades. The combination of the rotor blade vortex cores and rotor downwash are extremely dangerous. There have been numerous incidents and accidents caused by these high velocity winds. For example, other airborne helicopters and fixed-wing aircraft have been forced down, light civilian aircraft have been overturned, other static military aircraft have been damaged and even automobiles have been ruined. Debris and objects of all kinds have been blown about by rotor downwash and rotor blade vortices – things like rocks and gravel, tarps, signs, sheet metal, workstands and just about everything that might be found unsecured around any airport.

Let's take a cursory look at what is necessary to get a mass of over 30,000 pounds, like a CH-53, airborne. The air mass must be accelerated through the rotor disk at sufficient speed for the rotor blades to provide lift. (The old formula F = MA applies.) In determining the required induced velocity the disk loading must be known. Representative disk loadings of a few Navy helicopters are shown in Fig. 1. (Numbers in parentheses in column 2 represent an arbitrary disk loading used to derive the velocities shown in columns 3 and 4.)

The velocities shown in ft/sec and MPH are theoretical velocities which must be imparted to the air mass by the rotor in order to provide the required lift. As the rotor slipstream contracts, the average induced velocity doubles in magnitude downstream of the rotor plane. For example, it takes an induced velocity of 28.2 mph to get a CH-53 airborne but the velocity of the rotor downwash becomes twice as much downstream or winds of 56.4 mph. However, that isn't all. Associated with the velocity of the rotor downwash are even higher velocities concentrated in the rotor tip vortex cores. It is no wonder then that this combination of vortices and rotor downwash can cause havoc below and behind a helicopter.

Until tests have been conducted and more definitive results promulgated for the velocities to be encountered from rotor wash and rotor vortices, it is reiterated that the following rule of thumb precautions be observed by helicopter pilots:

- Ground taxi in and out of congested line areas instead of air taxiing.
- When air taxiing avoid other aircraft and vehicles laterally by 200 feet. Whenever there is a choice, air taxi downwind of parked aircraft and vehicles.
- When airborne, avoid flying over parked aircraft and vehicles or passing within 200 feet of buildings or other fixed obstacles and *never* fly over other airborne aircraft.
- Double the distances and altitudes for section takeoffs and landings.
- When possible avoid takeoffs and landings for a period of one or two minutes through the same airspace – below and behind other airborne traffic.

The writer is indebted to LTCOL Ross, USMC, Rotary Wing Branch, NavAirSysCom and Mr. Julian L. Jenkins, NASA, Langley for much of the information appearing in Fig. 1. Additionally, two reports were researched. The first was FDCC TM 67-2 by E. H. Flinn, Air Force Flight Dynamics Laboratory and Evaluation of the Wake of an S-58 (UH-34) Helicopter, July 1963, FAA Systems Research & Development Service, Project No. 348-011-01V.

Model	*Disk Loading	Ft/Sec.	MPH
UH-1	6+ (6.2)	36.1	24.5
SH-3	7-8 (7.5)	39.7	26.9
CH-46	7-8 (7.5)	39.7	26.9
CH-53	8+ (8.2)	41.5	28.2

*Values are approximate

$$V = \frac{DL}{2(r)}$$

Where: V is induced velocity (ft/sec)
DL is disk loading
r is density of air (.002378 at SL)

Fig. 1

CAUTION:

Wet Runway Ahead!

By J. E. Berta
FAA Liaison Officer
NavSafeCen

cer

A LOT of people think that hydroplaning is fun and it is when you do it in a hydroplane on a suitable body of water. Some people don't think that hydroplaning is fun . . . and it *isn't* when you are in an aircraft which is skidding out of control on a rain-slick runway.

When landing on a wet runway, close adherence to established operational procedures is essential relative to touchdown point, speed control and the use of speedbrakes, wheel brakes and reverse thrust.

A film of water on a runway can seriously affect aircraft ground controllability and braking efficiency. As the speed of the aircraft and depth of water increase, the water layer builds up an increasing resistance to displacement, resulting in the formation of a wedge of water beneath a tire. The vertical component of this resistance progressively lifts the tire, decreasing the area in contact with the runway until, with certain aircraft configurations and water depths, the tire is completely out of contact with the runway surface and starts hydroplaning on a film of water. In this condition tires no longer contribute to directional control and braking action is nil.

There are three types of hydroplaning:

• The first is *dynamic* hydroplaning which occurs when there is water standing on the runway surface. Water about one-tenth of an inch deep acts to lift the tire off the runway as explained before.

• The second type is *viscous* hydroplaning and occurs due to the viscous properties of water. In this type of hydroplaning a thin film of fluid not more than one-thousandth of an inch in depth cannot be penetrated by the tire and the tire rolls on top of the film. This can occur at a much lower speed than dynamic hydroplaning but requires a very smooth surface.

• The third type, known as *reverted rubber* hydroplaning, requires a prolonged locked wheel skid, reverted rubber and a wet runway surface. Reverted rubber is rubber which has returned to its natural liquid state due to its increased temperature. The reverted rubber acts as a seal between the tire and runway and prevents water exit from the tire footprint area. The trapped water is heated and converted to steam and the steam further prevents tire contact with the pavement.

It has been determined from data obtained during hydroplaning tests that the minimum dynamic hydroplaning speed of a tire is 8.6 times the square root of the tire pressure in pounds per square inch. The F-8J, for example, with a main tire pressure of 300 pounds has a calculated hydroplaning speed of approximately 150 knots. The calculated hydroplaning speed of the nosewheel tire (with 230 psi) is approximately 130 knots.

It is important to note that the calculated speed referred to above is for the start of *dynamic* hydroplaning. Once hydroplaning has started, it may persist to a *significantly* slower speed, depending on the type hydroplaning being experienced. A good example is hydroplaning in your car. Once hydroplaning (skidding) starts it *can* persist until the auto finally expends all its kinetic energy and comes to a stop.

Combating Hydroplaning

One way to combat the phenomenon of hydroplaning is runway grooving. Runway grooving was developed by the British, who are the acknowledged pioneers in texturizing runway surfaces. British experience dates back to 1956 following an increase in skidding accidents involving military aircraft. Among other experiments, the British tried grooving runways and the procedure worked so well that they soon expanded the program beyond military fields to civil aerodromes.

British success attracted worldwide attention and prompted a visit in 1965 by representatives of the FAA and National Aeronautics and Space Administration. After a thorough two-week tour of English airfields and test and experimental installations, the Americans returned home with a headful of ideas, not the least important being that the British experienced no hydroplaning difficulties on problem runways after they were grooved.

After examining various groove widths, depths and spacing, the FAA/NASA research and development group settled on 18 different groove patterns. These are undergoing laboratory and field tests to find the best one which will then be used for testing by NASA at its Wallops Island, Va. test facility using a variety of aircraft ranging from light planes to high performance jets.

The 18 test patterns have already been laid down on taxiways at five widely separated airfields – Miami, Cleveland, JFK, Salt Lake City and Los Angeles – to give preliminary data on how efficiently the grooves work under various climatic conditions.

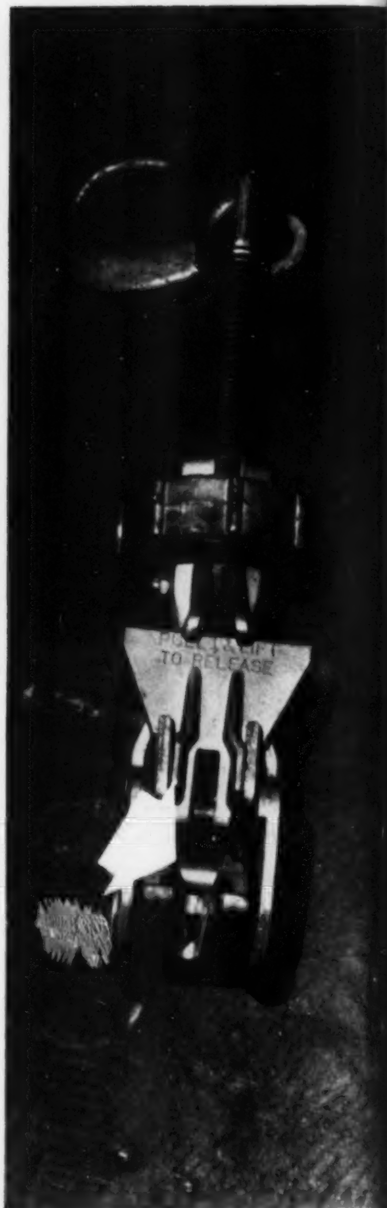
The Navy, recognizing the potential benefits to be obtained from runway grooving, has taken steps in this direction. Approval has been received to groove runway 17-35 at NAS Dallas in the near future.

In the meantime, the advice given at the beginning of this article is worth repeating: When landing on a wet runway, close adherence to established operational procedures is essential relative to touchdown point, speed control and the use of speedbrakes, wheel brakes and reverse thrust.

What's wrong with these tie-down heads?

DURING preparations for a return to ConUS from the Mediterranean, KENNEDY's Flight Deck Officer, LCDR R. C. Gentz, took a long hard look at the tie-down chains. Over 900 chains were carefully inspected and more than 250 defects were uncovered. A major Murphy was discovered in the TD-1 chain assembly – reversal of the locking pawl. In an effort to alert others to the same problem, a poster was made up to point out defects that had come to light. We are happy to pass them along. ◄

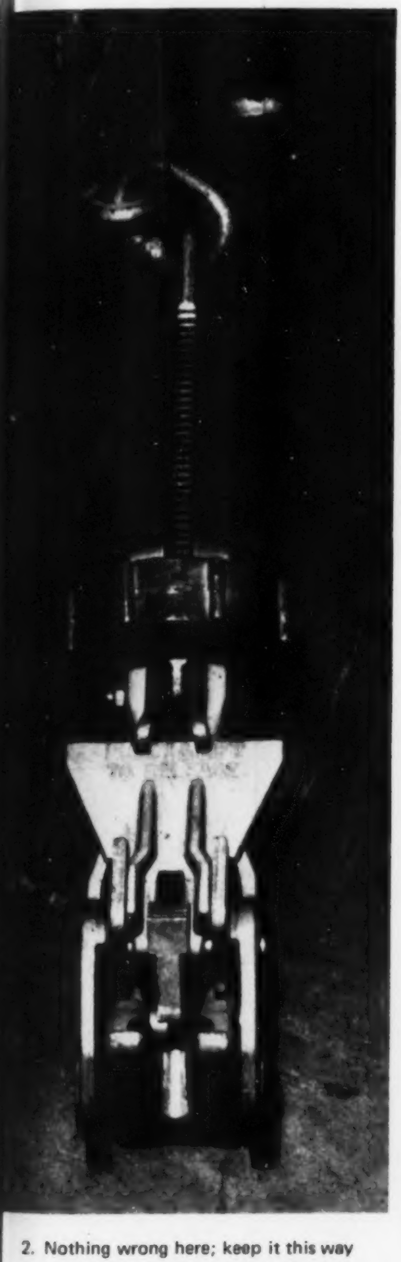
1



1. Locking pawl missing; chain can be lifted out without releasing butterfly.

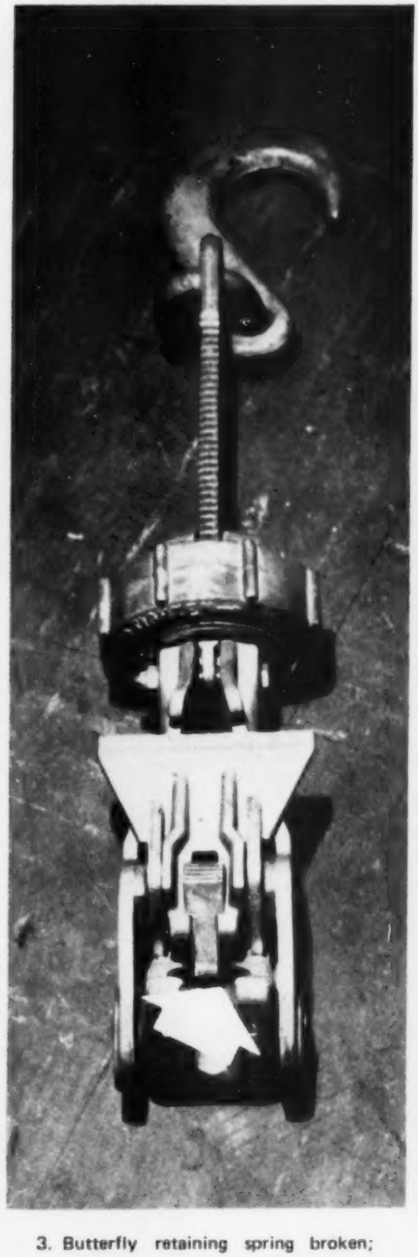
can be
fly.

2



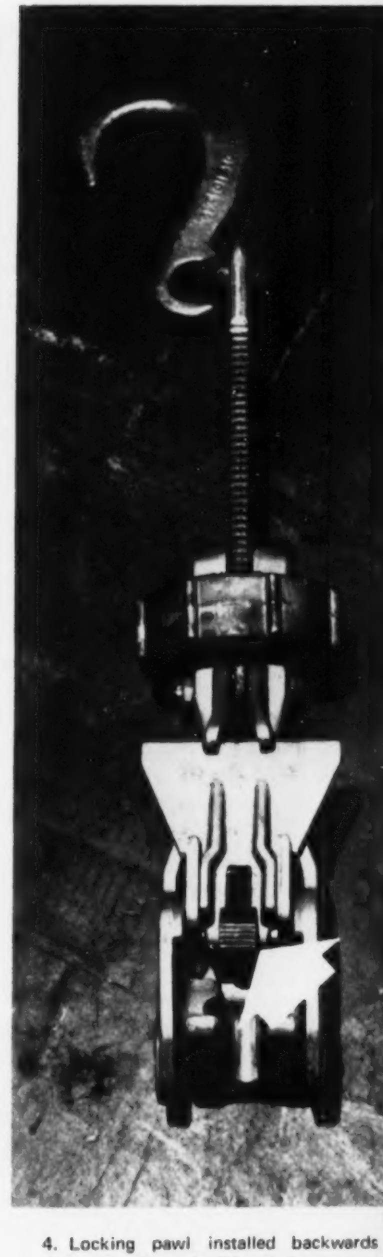
2. Nothing wrong here; keep it this way by periodic inspection and repair. Join chain and head with light cable to avoid loss.

3



3. Butterfly retaining spring broken; butterfly can release chain without warning.

4



4. Locking pawl installed backwards during head repair (Murphy); same as not having pawl.

Although in a slightly different vein than the theme of this article, here is what one Commanding Officer of a squadron had to say in his endorsement of an accident:

"The ultimate goal of naval aviation should be to achieve maximum combat readiness with the minimum losses in personnel and material. This can only be accomplished by careful continuous screening of aircrew personnel in all phases of their flight training, from the training command through the RAG and finally in fleet squadrons themselves. In addition to the need for aviators with exceptional natural and highly developed flying ability, heavy emphasis must be placed upon professional knowledge and character traits such as maturity, responsibility and sound judgment. Those found seriously lacking in any one or more of these areas require special attention and in all likelihood should be screened out of the program. To accomplish this, training squadrons must be staffed with highly selected personnel in order that individuals undergoing training may receive the closest scrutiny by the most qualified professionals. In addition, fleet squadron C.O.s must pursue an aggressive program which will enable them to detect aircrew weaknesses at the earliest possible time. . . . Each individual in this command has been directed by the C.O. to make known, either by Anymouse report or by direct communication with the Safety Officer, Operations Officer, X.O. or C.O., any evidence of unsafe flying practices or noncompliance with NATOPS and squadron SOP."

Most pilots will have an opinion on this subject.
What do you do if a pilot exhibits dangerous flight habits?

To Report or Not to Report

TWO FLIGHT instructors were returning to the hangar from the flight line after having led and chased eight students on a formation group grope. As they walked across the concrete they watched various other aircraft make final landings. One plane in particular did not quite get its nose high enough before touchdown and a mild porpoise, quickly corrected by the pilot, ensued. One instructor remarked that the type of landing just witnessed could lead to trouble. The other instructor said that he knew who was in the plane. Unable to inveigle his friend into a bet, the second instructor named the pilot and a little later was not at all surprised when the individual so named entered the line shack to sign his yellow sheet. Mere coincidence? Not on your life. Instructors, LSOs and LSEs who fly with or who wave the same pilots day after day usually know, by certain flight habits and characteristics, who the pilot is without benefit of a flight schedule. Just as everyone has a peculiar set of fingerprints, most pilots have a peculiar way of flying – readily and easily recognizable by one who frequently observes.

Nurturing Young Pilots

Operational squadrons subject the replacement pilot – regardless of whether he's a nugget or a second tour pilot – to a pretty thorough advanced flight and ground syllabus. This is as it should be! The newcomer is assumed to have certain skills and the squadron is interested in honing and polishing the rough edges to ultimately turn the individual into a representative member of the team. New pilots assigned to squadrons operating models with multiseat cockpits reap additional training benefits in that they usually fly with many different aircraft commanders. This is an advantage in those squadrons with strong standardization programs. New pilots are under constant observation by many others and any pilot weaknesses are quickly detected and just as quickly corrected. To a similar degree new pilots of single seat or single-piloted models are monitored carefully by section and division leaders. In the latter case it is true there isn't anyone in the cockpit peering over his shoulder but this is more than made up for by more detailed briefings and close attention to all observable phases of flying.

At other activities such as shore stations where administrative/utility flying represents the major effort, this may not be quite true, i.e. training programs may not be as comprehensive as in operational squadrons. At shore stations a more impersonal atmosphère prevails. The new pilot is more or less left on his own and may not benefit from regular instruction, constructive criticism or counsel. Additionally, the new pilot may be erroneously assumed to have more experience than is actually the case. Thus any weaknesses, if allowed to go unchecked, could ultimately lead to development of a dangerous habit.

Continued

A Case In Point

A helicopter accident which resulted in total aircraft destruction and fatal injuries to all on board may have been caused by flight weakness of the copilot. The helicopter was involved in a daily administrative/logistics flight transporting personnel and supplies between various shore activities and nearby ships. Weather was not a factor. Skies were partly cloudy, winds were light and visibility was seven miles or more. Flight duration, at the time of the accident, had been continuous for five

hours and the pilot had made 17 takeoffs and 16 landings. The HAC (helicopter aircraft commander) was known to usually permit the copilot with him to fly between takeoffs and landings but he made nearly all takeoffs and landings himself. The MOR (Medical Officer's Report) commented on both these facts. The AAB (aircraft accident board) had very little to go on in their investigation. One witness, a local civilian without any aviation knowledge, reported that he heard two explosions and saw the helicopter roll over twice in the air but he didn't see it hit the ground. The wreckage was confined to a very small impact area, about 25 feet in size. Evidence apparently ruled out internal explosion; however, destruction was complete.

The possibility of mechanical or engine failure cannot be ruled out but the remainder of text concerning this mishap will be devoted to a discussion of certain human factors about the copilot which came to light. As stated in the MOR, "There are some rather convincing arguments that copilot error may be (a contributory) cause." The copilot, a nugget, had been aboard the activity about one month; had not been through a RAG; had accumulated about 65 hours in model before reporting; had been on leave, in transit and checking in for about three months and in the short period of time since reporting for duty had flown three or four

familiarization/indoctrination hops. He had flown these flights with three qualified pilots attached to the same activity. One of them reported that the copilot had considerable difficulty with power changes and on two occasions had applied throttle in the wrong direction for the desired result and that he had fixed his attention on the manifold pressure gage instead of the RPM indicator. One other event occurred which indicated weakness on the part of the copilot when, during an autorotation, he permitted rotor RPM to build too high and in attempting to correct the situation had literally jerked the collective out of the instructor pilot's hand. The sudden increase in collective caused the RPM to drop way off. The instructor took over and was able to recover. The instructor pilot stated that all of the copilot's landings were unsatisfactory due to poor power control. Another instructor pilot reported that on one occasion the copilot had initiated power changes which resulted in complete loss of airspeed at 300 feet and then froze on the controls. Again, the instructor pilot

was able to recover. Both instructor pilots explained correct power change procedures to the copilot in the air and during their debriefs. Much detail has been related to substantiate the possibility that the crash might have been caused by induced blade stall, either with a mechanical problem or without, and that the HAC was unable to recover – if, in fact, the copilot was at the controls (probable) and if a power change was necessary for some reason (possible) and if the power change was made abruptly and incorrectly (probable).

Responsibility

Does a responsibility exist among instructor pilots in any organization to point out weaknesses or dangerous flying habits of other pilots in that organization? One submits there is precedence. In tailhook squadrons, every time the LSO waves a pilot, either in FCLP (field carrier landing practice) or aboard the ship, he grades the pass and discusses the approaches and landings with each pilot after every flight. Progress charts are maintained and posted for all pilots to see. Trends can be quickly spotted and any pilot whose approaches and landings begin to deteriorate is carefully counseled. Without discussing each phase, suffice it to say that to a degree the same holds true for ACM (air combat maneuvers), bombing and rocket flights, formation flying and other tactical aspects. The keys, of course, are formal training programs, standardization, supervision and counseling.

Other squadrons such as HC, HS, VP and VR (including COD) are a little harder to categorize. Some of these multiseat cockpit types have rather lengthy apprenticeship periods that new pilots must serve before being designated first pilots. The formal syllabus which new pilots are put through may take 12 months or longer to complete. Any weakness exhibited will have long since disappeared by the time an aviator is designated first pilot. The young pilot, during the early stages of his familiarization and indoctrination, has undoubtedly been instructed by many different plane commanders. Having different instructors works to the advantage of the young pilot if there is a strong standardization program within the squadron. When weaknesses become evident it behooves the instructor pilot to thoroughly cover the condition when it occurs, during debrief and in the flight write-up. This is necessary so that the next instructor can conduct a review of the earlier flight before proceeding into new work. Equally important is for someone in the squadron, possibly the standardization officer, to review the flight write-ups for each new pilot undergoing the syllabus.

Most shore activities face a more complicated problem. The station usually supports many different aircraft models; standardization frequently does not exist; formal training programs for each model are usually rare; scheduling is often not easy and assigned administrative duties may prevent a pilot from flying even if all other considerations are favorable. There aren't too many pilots assigned to shore duty without benefit of squadron experience *but there are some* and with the reduction in the number of squadrons, there are more of these individuals every day. In the accident cited, the copilot was one of them. In his case, admittedly, certain assumptions (perhaps incorrectly) have been made to make a point – not to lay any blame. What was the responsibility, if any, of the instructor pilots who took him out to call attention to his dangerous tendency to control power improperly?

Who Should Receive Reports

It is extremely doubtful that any commanding officer would exclude himself from the list of those who should know about marginal pilot progress. Indeed, most C.O.s insist they be among the first to be apprised of pilot deficiencies and tend to be rather perturbed if such problems are kept from them. Squadron C.O.s, by virtue of being in such close contact with all of their pilots, usually are right on top of such situations. Skippers of shore stations, however, are in a completely different category. The things that are closest to their hearts – flight operations – so often must be pushed in the background by problems involving personnel ceilings, budgetary considerations, public relations ventures, construction delays and other priority management problems. Nevertheless, the C.O.s of these activities must be kept advised by the Operations Officers in matters concerning the flight progress of newly assigned officers. In an attempt to be practical one submits that the standardization officer for each model at a shore station is the one who should be "on top" of the flight progress of all pilots flying that model. The standardization officer in turn must keep the Ops Officer current. At most shore stations the standardization officer knows more about qualifications of pilots flying the model for which he is responsible than anyone else. Some may take the position that any standardization pilot worth his salt is going to read the write-up of each syllabus flight of new pilots anyway. This is true if the write-up isn't filed in the pilot's flight jacket before the standardization officer sees it and also if the instructor pilot takes the time to write up each flight in detail – few pilots write up a hop in the detail that they will talk about it.

To Report or Not to Report

If there is a truism about aviators it is the reluctance of one pilot to bring to command attention the difficulty another pilot is having. Perhaps this oft-misguided loyalty is because the reporter doesn't

want "to cause trouble" for his buddy or be responsible for his fellow pilot being the subject of an aviator's field disposition board. Perhaps one way to approach this is to make a generalization that this would be the very last course of action that any C.O. will take. Long before a C.O. will convene a pilot's field disposition board he will run out of constructive criticism – he will use up all means of counseling – he will assign his most experienced pilots to give special instruction – he will, if a RAG exists for the model in which a pilot is having trouble, undoubtedly request a special quota. In short, a C.O. will do everything possible to get a slow pilot up to speed before, and usually as a last resort only to keep him healthy, convening a disposition board.

Summary

There is absolutely no intent in this article to suggest, imply or infer that every aviator is to put on his 59 cent, special investigator's badge and run to his C.O. to tell him that Joe bounced on landing or made a slight S-turn on final. What has been suggested is that a responsibility does exist on the part of section leaders, plane commanders and instructor pilots – anyone engaged in instruction or supervision – to report repeated weaknesses or dangerous habits to the proper individuals so that a thorough discussion of aerodynamics, system operation, pilot technique or whatever can be conducted to help the pilot being indoctrinated or refreshed to understand and correct his problem.

Although attention has been focused on the nugget, this equally applies to pilots undergoing instruction for a second tour after having commanded an LMD (large mahogany desk), attended school or having been assigned other duty away from the operating arena for a lengthy period.

A Proposition

It is recognized that with the reduction in support personnel, operating money and CRT flight hour restrictions, "the big picture" is getting even more complicated. However, in the interest of flight safety, pilot morale, junior officer retention and numerous other reasons, positive action within available assets is needed if we are to detect our weaknesses and maintain our standards. What can be done to improve the situation? Many things. Starting at the top it might be suggested that a reduction of the number of models to be maintained and operated for CRT and administrative/logistics flying at shore stations would help. Orders to nuggets might ensure assigning an individual to a shore activity operating the same model the nugget flew in the training command – or at least a similar type. A steady flow of fleet pilots, qualified in model, to shore activities would provide the experience needed for standardization instructors. Availability of a few RAG quotas for nuggets ordered to shore stations direct or a couple of RAG instructors, if available, would help prepare these pilots for "operational" flying in model. Meanwhile, commanding officers can help themselves by setting up rules. For example:

- Designate a pilot experienced in model as the standardization pilot.
- Encourage continuity of instruction without long breaks when possible.
- Promote standardization.
- Establish a formal flight and ground syllabus for each model supported.
- Provide special instruction for anyone having "trouble" and insist that extra effort be provided to bring weak pilots up to standard. ◄

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E Jet/Prop Blasts!

AN A-7 aircraft being taxied across the flight deck had to pass behind another A-7. At this time the axes of the two aircraft were nearly perpendicular. Before the moving aircraft could clear the area behind the other A-7, the pilot of the parked A-7 in front added power (about 80 percent). The resulting jet blast caused the taxiing A-7 to tip over on its wing (wings were folded at the time). The aircraft then began to skid toward the edge of the flight deck and the pilot, believing the aircraft was going over the side, ejected. After the pilot's ejection, the aircraft came to rest at the edge of the flight deck (see photo). The pilot survived the ejection but suffered major injuries.

This is but one example of numerous cases reported to NavSafeCen where aircraft have been damaged and personnel injured by jet or prop blast. This indicates that many personnel are either unaware of or inclined to underestimate these hazards.

Other cases of jet/prop blast damage/injury include these:

• During a carrier aircraft launch, a plane director was directing aircraft forward from the after starboard side. Before directing one A-7 forward for launching, the director noticed two blue shirts and a plane captain standing in front of a downed A-7 which was parked aft of the one to be moved. The director motioned for the three men to clear the area. The two blue shirts went forward and the plane captain went aft of the downed A-7 and stood by the port main landing gear for protection against jet blast. The director then motioned the A-7 forward and as the pilot added power, jet blast caught the plane captain, lifted him about 10 feet into the air and blew him about 50 feet down the deck. He suffered major injuries when he landed on the deck.

• A flight deck crewman was blown off the No. 1 elevator and over the side of an aircraft carrier when he walked behind an F-4 aircraft which was preparing to taxi forward. The crewman suffered minor injuries upon impact with the water. He was rescued by a helicopter within a few minutes and returned to the ship.

• An F-4J made an arrested landing during carrier qualifications. After landing it was taxied forward toward the starboard catapult in preparation for another launch. The aircraft was stopped just behind the raised jet blast deflector (for the starboard catapult) at an angle of about 30 degrees to the right of the catapult track. Another F-4J was positioned on the starboard catapult at idle power while being serviced with high-pressure air. Flight deck troubleshooters discovered that the No. 6 fuel cell hydraulic pump in the F-4J which had just landed was inoperative. The troubleshooter climbed up on the port wing with the intention of checking to see if any circuit breakers in the cockpit had popped. The aft cockpit canopy was closed so the troubleshooter tapped against the side of it and the RIO opened the canopy. After examining the rear cockpit circuit breaker panels and finding no discrepancies, the troubleshooter climbed off the aircraft as the F-4J on the starboard catapult went to full military power for launch.

As the RIO heard the engine acceleration of the launching aircraft, he remembered that his canopy was still open and attempted to close it. About three to four seconds after the canopy control lever was placed in the closed position, the rear cockpit canopy was separated from the aircraft by the jet blast of the launching F-4.

All the mishaps mentioned thus far occurred on flight decks; however, a number of jet/prop blast mishaps have also occurred aboard air stations. In one of these incidents a civil cargo aircraft blew a 110-pound aluminum deck pallet (88 inches by 54 inches by three-fourths inch) into the air and propelled it 25 feet. The flying pallet struck the tail of a US-2A, necessitating a rudder change.

In another case a TA-4F taxiing out of the chocks at a shore station added excess power and blew a ladder, which was lying on the ramp, into an adjacent TA-4F aircraft causing the puncture of an external wing tank. The resulting fuel spill created a substantial fire hazard.

All of these mishaps were avoidable. They could have been prevented if all the personnel concerned had obtained a better appreciation for the tremendous force of the jet/prop blast which exists behind aircraft which are operating at relatively high power settings. Pilots, plane directors and all other personnel who must work around aircraft when engines are operating must strive continuously to keep this hazard in mind.

Beware prop/jet blast.

It's a potential killer. ◄

Survival Training Is Insurance

QUITE A BIT can be learned from the survival experience of the pilot and copilot of a TA-4F who were forced to eject. Here's the investigating flight surgeon's discussion:

"The area where real danger to the health and well-being of the pilots could have arisen was after ejection and during survival in the water. The copilot unfastened his oxygen mask during parachute descent, per NATOPS. He stated that he intentionally did not inflate his Mk-3C in order to go under water and not become entangled in the chute. He also made the decision not to deploy his liferaft since the rescue helicopter was in the area and he thought the raft might hamper rescue operations. However, he did retain the seat pan and could have inflated his raft had it become necessary to do so.

"The pilot stated that during his parachute descent he became complacent since rescue vehicles were already in the immediate vicinity. He did *not* unfasten his oxygen mask until his bailout bottle ran dry. He did *not* inflate his Mk-3C during parachute descent nor did he deploy his liferaft at sufficient altitude to allow it to fall far enough to activate the inflating mechanism. After water entry he did *not* get rid of his parachute immediately. He inflated the right side of his Mk-3C but was unable to pull the toggle on the left, due, he believes, to the fact that he was unable to obtain sufficient leverage to exert the proper amount of force. (The left side was subsequently successfully inflated in the emergency room of the dispensary.) After surfacing, the pilot released his koch fittings but found that some shroud lines had become entangled around his left foot and around the lanyard leading to his liferaft. He then released his rocket jet fittings and untangled the shroud lines. The raft-chute-seat pan complex then quickly sank.

"The rescue helicopter made its first pass at the pilot but he was still attached to his chute. The helo then picked up the copilot using a rescue sling, returned and picked up the pilot in the same manner. Both pilots were essentially unhurt but were extremely cold during the ride back because the helicopter door was kept open.

"Several aspects of the survival procedures of these pilots could have led to adverse results if rescue had not been so prompt. As stated above, neither pilot inflated his Mk-3C during descent. The TA-4F NATOPS does not mention this but most survival films and lectures recommend this procedure in the event the pilot loses consciousness or otherwise becomes incapacitated on the way down. An inflated Mk-3C would prevent drowning if this should occur. Neither pilot deployed his liferaft, as is required by NATOPS. The copilot intentionally did not do so but retained the raft so that he could have deployed it if the necessity had arisen. On the other hand the pilot did not retain his raft and seat pan. He was not wearing the required survival vest. If rescue had not been prompt, he could have been in serious trouble in 62° water with no raft and no signaling devices except pencil flares."

The answer to such survival equipment and procedure deficiencies, the flight surgeon says, is increased emphasis on survival training. *(To which we must add one great Amen! And don't let a favorable situation fool you; prepare for the worst! – Ed.)*

Release of Fittings

AFTER rescue, a pilot reported that he had used a non-NATOPS approved procedure for parachute release over water. He deployed his raft, then put his hands on the koch fittings and when the raft hit the water, counted one-two-three and released them. The chute left him; he went under water, surfaced and boarded his raft.

This is not the first time use of this procedure has been reported. Last year, VA-97 queried the Safety Center on the advisability of such a practice. (Please see p. 47, May 1969 APPROACH.) As a result of VA-97's letter and the Safety Center's subsequent recommendation, NavAirSysCom (Naval Air Systems Command) had Naval Aerospace Recovery Facility El Centro evaluate this parachute release technique. El Centro recommended that the technique be discontinued.

"In reviewing the photo coverage of the test jumps, it was evident that oscillation of the parachute commenced upon deployment of the raft and equipment," the El Centro final report states. "This created a

notes from your flight surgeon

problem for the test subject. It became impossible to keep the equipment container in sight since the pendulum motion placed the equipment container behind the jumper's body at times. This, in addition to impairment of downward vision by the inflated life vest, negated accomplishment of the procedures under evaluation. None of the six test jumpers were able to ascertain the moment the container contacted the water."

El Centro feels that the method, as tested by experienced test parachutists under ideal conditions, is impractical and its use by inexperienced personnel in an emergency bailout/ejection could result in inadvertent premature canopy release.

Super-Caution Needed

A MAINTENANCE CPO's inattention and haste during flight operations led to a preventable flight deck accident. He also lost his chance to avoid injury by not wearing his flight deck hardhat.

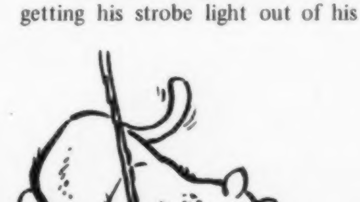
As squadron maintenance CPO he was on the flight deck near the island to observe flight operations during a scheduled launch. He saw what he thought was a discrepancy in an aircraft and ran toward it, failing to notice an A-7A at idle power just forward of the island. As he ran several feet behind the tailpipe, jet blast hurled him eight feet through the air and blew him into a yellow tractor. He struck his head, sustaining a skull fracture and momentary loss of consciousness. At the time of the squadron's report it was estimated that he would be hospitalized 20 days.

The CPO had limited experience on a carrier flight deck – only about two months. This should produce super-caution but in this instance, zeal to correct a possible discrepancy apparently overrode awareness of hazards.

The investigating flight surgeon noted that the CPO's injury might have been prevented if he had been wearing the required protective flight deck helmet.

No Vest, No Gloves

RECENTLY, a pilot had trouble getting his strobe light out of his right shoulder pocket under his LPA-1 life vest after a successful over-water ejection. He managed to get it out and then discovered it had no retaining lanyard. He had to hold it in his hand until rescued. He also reported that holding an ignited Mk-13 Mod 0 signal flare was painful because he was not wearing gloves; exercising his "option of not wearing gloves during carrier operations" was the way he put it.

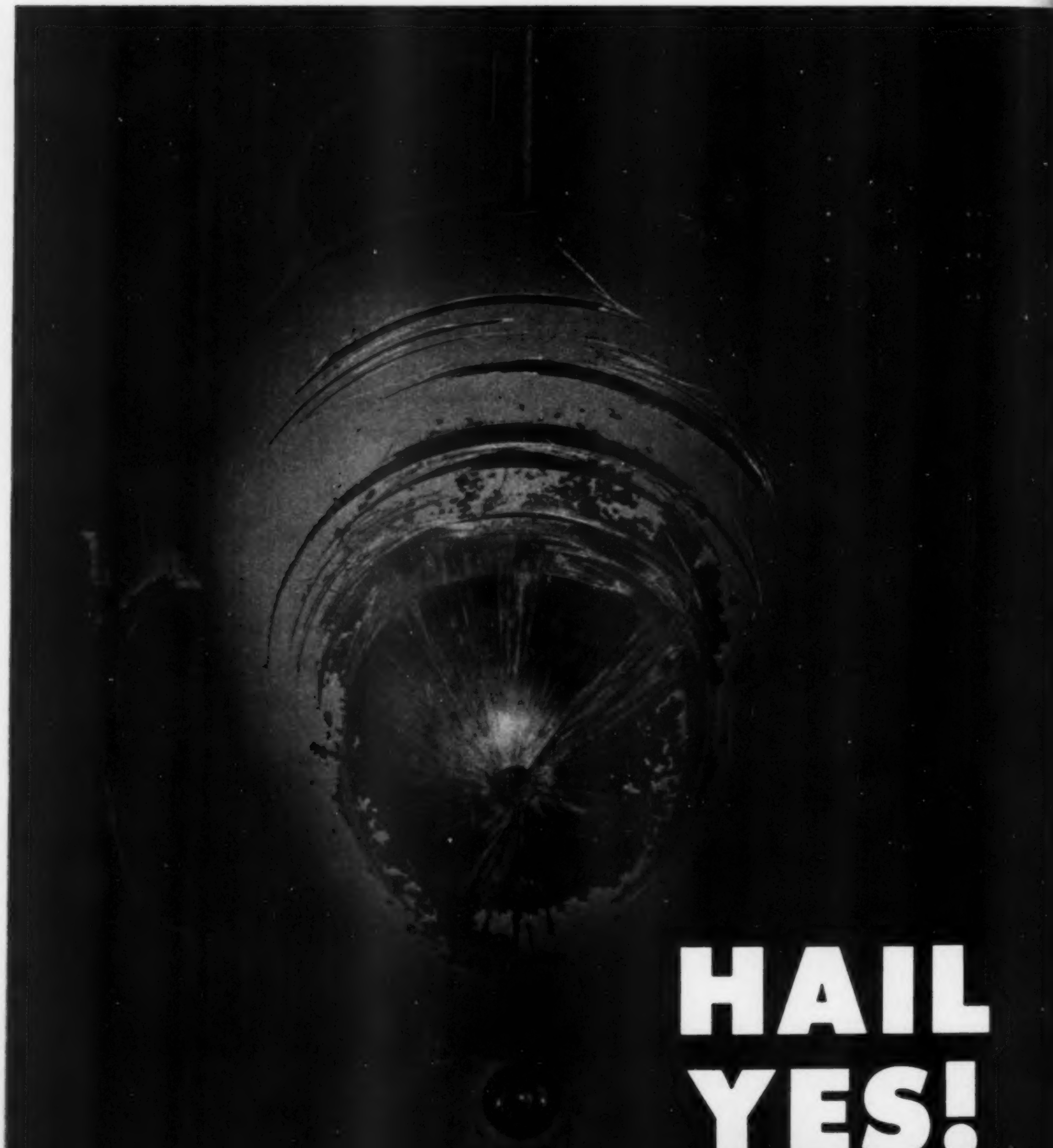


Two points germane to survival are evident here:

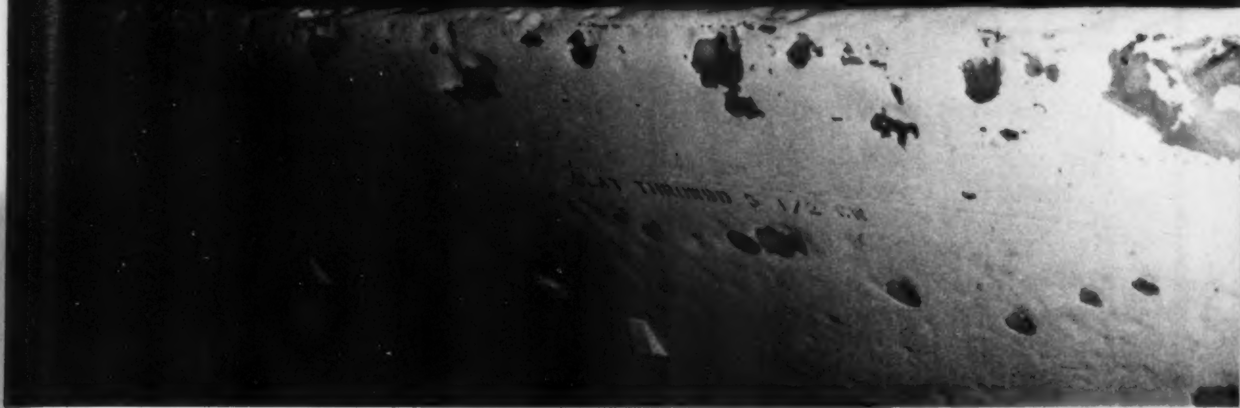
- The pilot should have had on a survival vest. Air Crew Systems Change 162 says, "All pilots and aircrewmen except those wearing T-65 body armor shall be equipped with and wear the SV-2A survival vest." Items on the vest, including the strobe light, are secured to the vest by light nylon cords, preventing loss while still permitting use of the items.
- The pilot should have been wearing his gloves. He was *not* covered by OpNavInst 3710.7D, Ch-3, (General NATOPS), then in effect, which stated that gloves substituted for non-available anti-skid/slip types gloves could be removed on low-level overwater flights and launch or recovery operations aboard ship. *(The revised General NATOPS, 3710.7E, does not include this provision. – Ed.)* He was flying at 14,000 feet just before the mishap which necessitated his ejection.

Know your survival gear and wear it according to requirements – survival gear protects *you*.

Reams have been written about aircraft in thunderstorms yet many pilots and crews don't become believers until they learn by experience – and sometimes that is too late. Here's a chance to learn from the experience of one crew which, through no fault of its own, was inadvertently thrust into a violent thunderstorm. Hopefully the following information will sufficiently influence others not to gain this type of experience firsthand. – Ed.



HAIL YES!



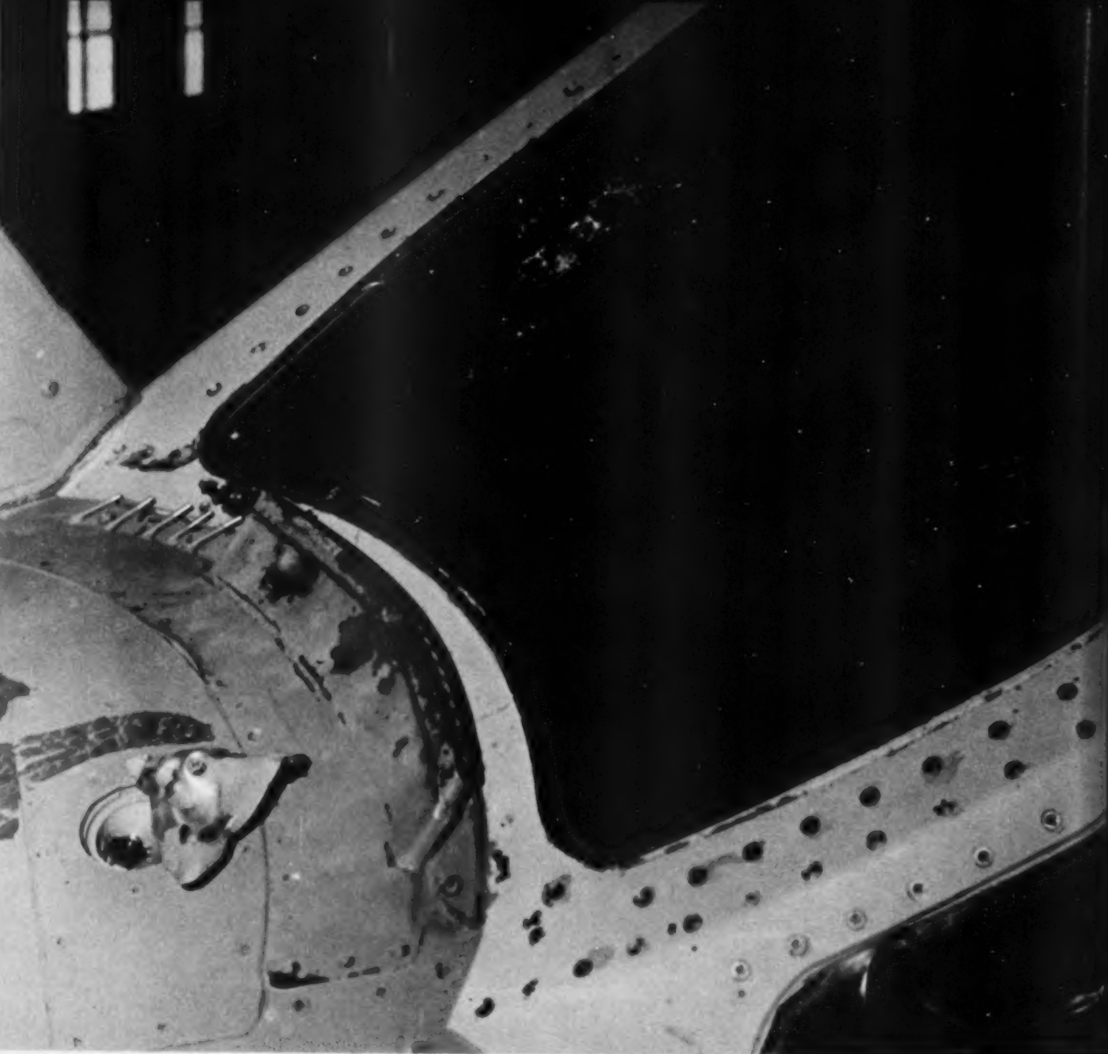
AN *INTRUDER* was at flight level 280 enroute to a preplanned refueling stop in New Mexico. Enroute weather was generally IFR with stratus clouds but the aircraft was under control of an Air Route Traffic Control Center. About 44 minutes after takeoff a Severe Weather Warning area developed across their flight-planned route. Although the crew had been in radio contact with two Air Route Traffic Control Centers and several enroute METRO stations since becoming airborne, *no one had passed along the new WW information.*

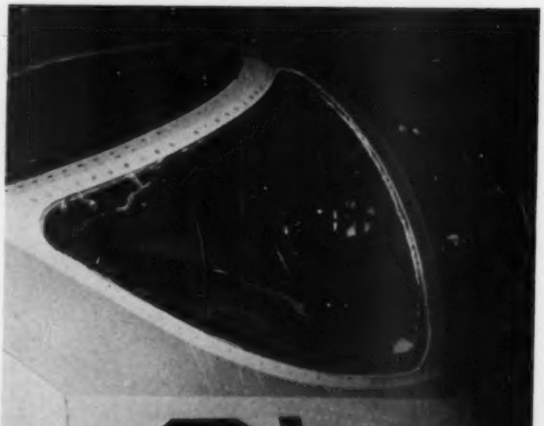
The thunderstorm cells were encased in stratus clouds and could not be seen visually. High altitude and moist air degraded search radar, covering the entire scope with the bright video characteristic of very moist air and further hindering early thunderstorm detection. The BN (Bombardier/Navigator) stated that he might have been able to pick up cells along their flight path sooner had he been expecting severe weather but the smooth flight thus far and the lack of ground return influenced him to lower his guard.

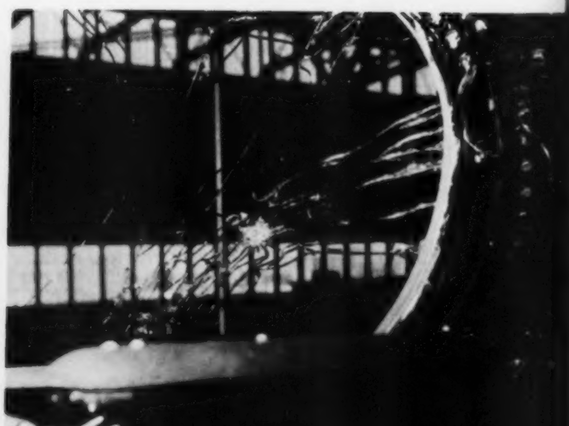
So the stage was set and another round in the continuing battle of man against the elements commenced. Moments prior to entering severe turbulence and hail, the BN alerted the pilot to a bright line return on the radar indicating very dense weather. It was determined that the weather was approximately five miles thick and that the best course of action would be to maintain a wings-level attitude and press on rather than attempt to turn and run the risk of increased exposure time.

When hailstones, some the size of baseballs, began to beat on the aircraft, speed was reduced from 300 to 250 kias. Suddenly there was a loud pop and a visible crack appeared in the BN's windscreen! The pilot and BN watched the crack spread as they lowered their seats and pulled their green visors down over their clear ones. The pilot's windscreen began to crack, followed by a loud explosion and decompression as the left side windscreen blew out. Immediately there was a rush of air into the cockpit, accompanied by a near-deafening roar. Hailstones and ice chips smashed against the back of the cockpit and part of the instrument panel glare shield shattered.

The pilot checked his attitude on the VDI (Vertical Display Indicator), then crosschecked the VGI (Vertical Gyro Indicator); he was wings level and five degrees nose down. His pitot static instruments appeared to be inoperative. Airspeed was about 80 knots indicated and the altimeter was fluctuating ±500 feet; the VSI (Vertical Speed Indicator) was also erratic. The MA-1 compass was operating and it crosschecked with the wet compass, the compass rings around the PHD (Pilot's Horizontal Display) and the BN's DVI (Direct View Indicator). The cabin pressure altimeter was indicating about 2000 feet above the pressure altimeter and the AOA (angle-of-attack) appeared to be working properly. All of the engine instruments were functioning properly and giving normal indications. **Continued**







The damage sustained by this A-6 could easily have been caused by enemy ground fire or errant golf balls! Few aviators realize the destructive potential of hail found in thunderstorms until some event like this occurs. A little hail can go a long way towards spoiling your afternoon!

Although severely damaged, the aircraft handled well; yet ejection was a distinct possibility and thoughts of ejecting into a hailstorm gave added emphasis to the necessity of flying out of the cell. Just before the BN lost his search radar he reported that his 30-mile scope was covered with dense, stormy weather. The pilot noted that the leading edge of the port wing slat had many large holes and dents in it which caused him to distrust his AOA, since the probe could easily have been bent.

A decision to descend was made with the hope of exiting the storm at its bottom. Terrain elevation was estimated at 4000 to 5000 feet. The pilot switched the UHF radio to GUARD and IFF to EMERGENCY. It was difficult to hear radio transmissions because of the loud noise of air rushing into the cockpit. He tightened his chinstrap and oxygen mask and turned the radio volume full up. During descent the hail stopped and turbulence decreased. The pilot leveled off at 7000 feet on the pressure altimeter and flew straight and level for awhile, as the weather appeared to be breaking up. During this time the pressure altimeter was stable but the airspeed fluctuated between 0-120 knots and the cabin pressure altimeter read 9000 feet. There was no radar altimeter in the aircraft.

A tacan lock-on from an enroute NavAid enabled the crew to plot a 270 degree/100nm course to their destination. Shortly thereafter, radio communication was established between an airfield tower, controlling ARTCC and the *Intruder* crew. There were 10,000-foot peaks between the aircraft and the point of intended landing so with clearance from Center, the pilot commenced a climb to VFR-on-top. He estimated his airspeed by comparing attitude with power setting and crosschecking AOA, which he now believed to be reading low. In the climb the inertial altitude (with a track radar ground lock) agreed with the cabin altimeter. The crew had now established the capability to communicate and navigate and had attitude, heading and airspeed information. VFR on-top was reached at 17,000 feet msl.

The mechanical and procedural portion of their ordeal practically over, the crew directed its energy to physiological problems. The pilot felt pain in his left arm, which had been bleeding since the windscreen was destroyed, and informed Center of his condition. Both pilot and BN had become numb from the cold and putting cabin temperature to full hot gave no relief. Center switched the crew to destination Approach Control and a T-38 was vectored to escort the stricken A-6A down through the overcast to a safe landing.

The aircraft was met by the base crash crew and flight surgeon. The BN was uninjured and the pilot had received minor injury to his left arm. Both men were visibly shaken by their encounter with Mother Nature. The aircraft, also visibly shaken, did not fare as well. Damage to exposed surfaces ranged from minor to severe, generally depending on how perpendicular the surfaces were to the free airstream. Neither of the J52 engines was damaged.

The advice remains the same – *stay out of thunderstorms when possible*! However, if you find yourself doing battle with one, keep your cool as did this crew, follow NATOPS and you too will probably come out smelling like a rose – all things considered.

The Board recommended that information regarding Severe Weather Warnings disseminated by the U.S. Weather Bureau in Kansas City and information received from local reports, including PIREPS, be passed on to aircraft by enroute METROS and Air Route Traffic Control Centers when such weather lies along the flight plan route.

Don't wait until face to face with a thunderstorm to learn what actions to take. Prepare yourself now for what may happen when Mother Nature decides to do her worst. – Ed.

Water Freezing in F-4 Static System

AS a *Phantom* RAG instructor, I was scheduled to lead an early morning four plane bombing hop. However, 400/3 weather canceled that event and an RIO out-and-in fam flight was laid on. Having some squadron business to accomplish at NAS Southeast, I worked up a full IFR flight plan and briefed my student for his first F-4 flight. I emphasized the procedures and techniques involved in instrument flying and gave a lengthy brief on all emergencies apt to be encountered (loss of UHF, ICS, instruments, upper block disconnection, hypoxia, etc).

It had been raining steadily for two days. After engine start, the static correction would not engage, the radios continuously cycled frequencies and after spreading the wings, the compass wouldn't synch. Since my oxygen mask exhalation valve had also malfunctioned, I taxied to the pits in hopes of drying out the radios while waiting for a new mask. Parenthetically, I had made a thorough preflight and found the bird shoddily prepared, with no LOX and no air turbine pressure but these discrepancies were corrected and my qualified plane captain assured me all was well in the preflight area.

After 20 minutes everything came on the line and we launched. I energized engine anti-icing as I was expecting problems on climbout and the weather guessers had forecast mixed icing from 5-12,000 feet. We leveled off at FL 350 in the clag and, after feeling out the aircraft and calculating the fuel specs, I plugged in the AFCS. With four bombracks and a drop tank, the fuel flow was 1000 pounds per hour high, TAS 25 knots slow and headwinds reduced the ground speed to six nautical miles per minute. This was slow but fuel was no sweat on a 600 nm flight.

During the next hour of solid IFR flight we encountered light to moderate turbulence, as forecast, but other than a 25-knot TAS fluctuation, everything looked good. About 200 nm from NAS Southeast we lost UHF transmitting power but Center picked this up quickly and communicated with us via IFF IDENTS and changing codes. Then I heard Center replying to an airliner's query about our altitude and I disengaged the autopilot and found the stick stiff, both longitudinally and laterally. Aha! I thought, icing in the bellows.

Shortly thereafter we broke into the clear above a ragged stratus layer and I could see that the aircraft was changing altitude! Fortunately, our radios came back

The purpose of Anymouse (anonymous) Reports is to help prevent or overcome dangerous situations. They are submitted by Naval and Marine Corps aviation personnel who have had hazardous or unsafe aviation experiences. These reports need not be signed. Self-mailing forms for writing Anymouse Reports are available in readyrooms and line shacks. All reports are considered for appropriate action.

REPORT AN INCIDENT, PREVENT AN ACCIDENT

on the line and I declared an emergency and got Center to get us off airways and switch us to Approach Control.

I found that the airspeed, pressure altimeter and vertical speed indicator were completely frozen so I told Approach Control that I intended to position the aircraft 10 nm south of the IAF in the clear (tops reported at FL 290) and by flying angle-of-attack and standard penetration configuration would descend in the ballpark for GCA's height-finding radar to spot us in the event our radar altimeter failed.

Both Approach Control and RATCC cooperated fully and I broke out at 1000 feet, south of the field. At this time the altimeter indicated 32,000 feet and the airspeed read 1.6 indicated mach number – so the flaps wouldn't extend even though I was flying at optimum AOA (speed limit switch). I had lots of gas, so I orbited the field for 10 minutes calming my nugget RIO (and myself) and planning a no flap landing on the long runway with the E-27 arresting gear rigged. Everything came back to normal on final, so I extended the flaps and landed. After thanking all hands for saving us, I called the squadron and talked with the leading electrician, who described in detail the method of draining the static system and CADC. We accomplished this, getting a good quart from the low point drain and after gingerly flying around the field VFR we departed for an uneventful trip home.

Draining the pitot system is not a part of the pilot's preflight test and a screwdriver *is* required to actuate the raised drain but here are some points to ponder:

- Beware of an autopilot that's too smooth in bumpy clouds.
- Don't hesitate to declare an emergency when things go wrong.

FAA folks, Approach Control, et al are highly competent and understanding when you get right down to the real nitty gritty.

LCDR Mouse

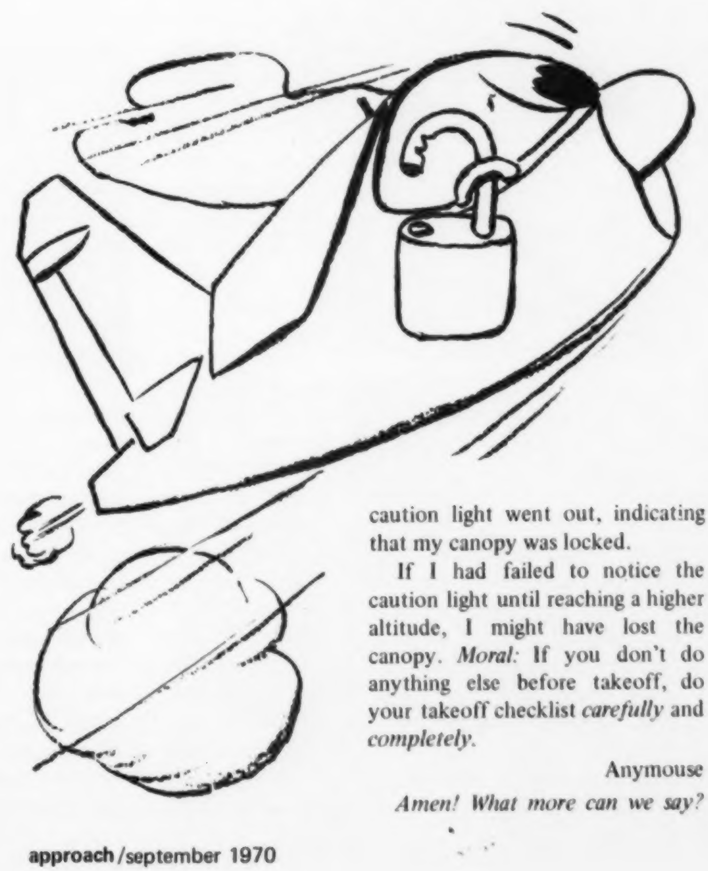
The whole team worked together to bring this flight to a successful conclusion. The installation of a protective cover on the pitot tube when the aircraft is on the ground will do much to prevent a recurrence of this problem. In addition, increased emphasis should be placed on checking this item (draining the pitot-static system) during the plane captain's preflight anytime the aircraft has been exposed to rain while on the deck.

Checklists Are Invaluable Use 'Em

ON a twilight launch in my A-7B, I thought when I closed my canopy that I had it completely locked, but later events proved me wrong. Due to the twilight lighting of my cockpit, the warning light did not attract my attention and I took off with the canopy unlocked.

Passing through 10,000 feet (and when it was considerably darker) I noticed the caution light. The fact that I was No. 2 man and had to keep my leader in sight under difficult lighting conditions may have contributed to my failure to notice the caution light earlier.

I gingerly pushed the handle forward another inch or so and the caution light went out, indicating that my canopy was locked.

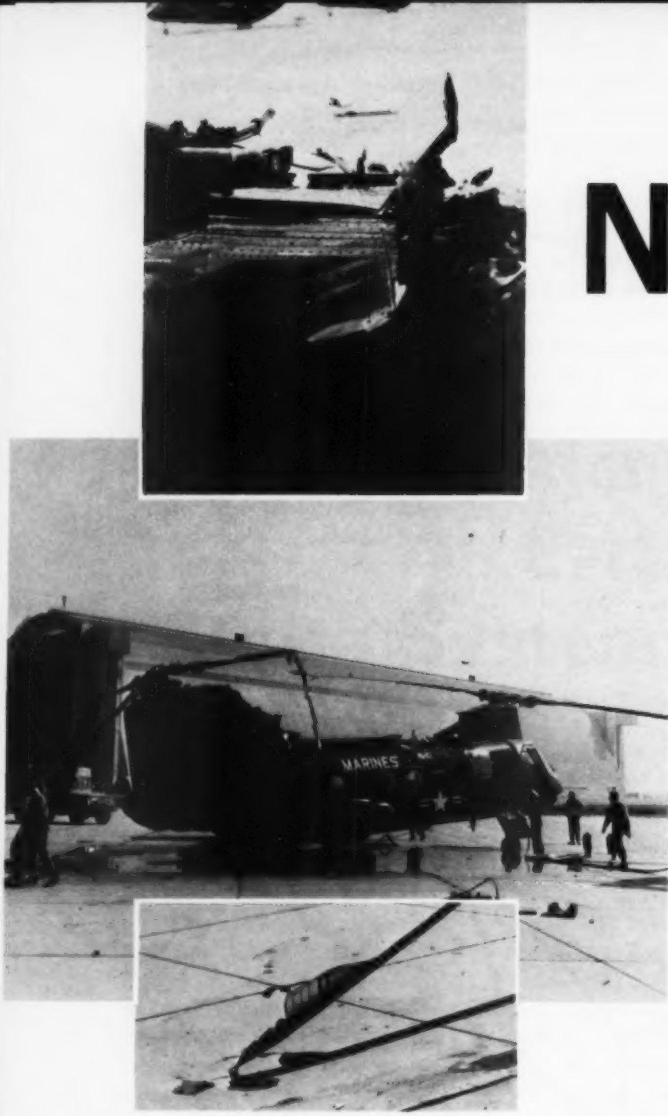


If I had failed to notice the caution light until reaching a higher altitude, I might have lost the canopy. *Moral:* If you don't do anything else before takeoff, do your takeoff checklist *carefully* and *completely*.

Anymouse

Amen! What more can we say?

No Way to



SHE was gorgeous. Perhaps not absolutely the most beautiful of the bunch but her carriage was erect, her form shapely and she had all of the right equipment distributed just so. Like the rest of us she too had a number – triple three one. She had won her title, Summer Queen, hands down – not much competition. Unlike most queens her reign was considerably shorter than one year. She was not put on display in auditoriums, state fairs and the like. She did not make any TV appearances or appear at any political rallies. Hers was a rather lonely reign. She was the hangar queen. Oh, yes, she did leave her "throne" once or twice but it wasn't for very long. She began her reign the latter part of June when she was towed into the hangar for her sixth calendar check. Four months later her reign ended.

This then is her story and it's not a happy one because she was isolated from the rest of her kind. No longer was she useful. She was banished.

Initially men courted her. From her prominent location in the hangar she could see everything going on around her. She was looked over very carefully. She could tell by the way some looked at her that they were really interested. Others looked at her coldly as if they didn't care. She overheard one of them say, "All the pitch varying housing seals and all the pitch link assembly bearings on the aft rotor head need replacing." It thrilled her when the MAFs were issued to do this. Maybe someone would decide to put on new rotor blades. That would be neat! Ten days went by rather quickly without too much activity. Some action took place such as removing the aft rotor head to facilitate changing seals and bearings but no MAFs were issued for this and the Queen felt kind of sorry for herself when her regular attendants didn't do the job. Two substitutes from the line performed the work. They weren't exactly strangers – she knew them casually but they weren't her close associates – her friends. For the next two weeks she sat in lonely splendor. She heard things like NIS, AOCP and NORSG as time after time her attendants walked by. No one bothered to look at her; no loving pats came her way. She felt, and was, neglected. Once in a while an attendant or two approached, usually in a hurry, and took something else away from her to install in another airframe. She longed for the MAFs that used to accompany her attendants who worked on her but there weren't very many these days. Her forward rotor head was removed (high time) and replaced. Then a new avionics attendant replaced the rotor power distributor assembly on both rotor heads. Since he didn't have previous experience with one of such regal stature, the Queen realized why his work was often slow and laborious. Later when questioned about his work he admitted he didn't know that the rotor head required a retaining nut or what it looked like. He knew that he replaced the forward assembly for a QA inspector. Another week passed but the Queen felt

Treat a Lady!

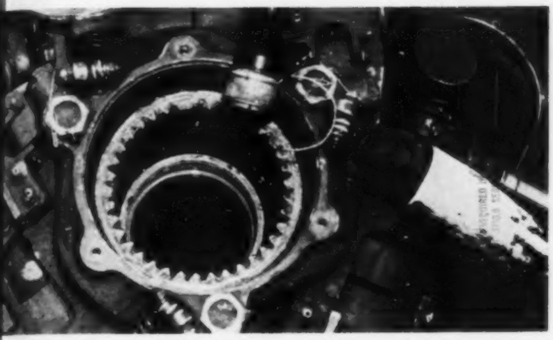


Photo above shows aft rotary wing head of the Queen, as found by AAR Board, with the attachment nut *not* installed, while the comparative photo below shows the rotary wing head attachment with nut installed.

pleased when she was given a brief respite from her lonely vigil by being towed out to the line for an electrical power check. Another three weeks went by before her attendants returned one day to sync-phase the rotor systems and to check the distributor assemblies. In early September the Queen came out of check and was scheduled for a test hop but this was canceled when the rotor brake could not be moved. After another 10 days the Queen finally became airborne. She was hovered for about five minutes but then was grounded again because of two hot starts. A few days later she was flown for almost half an hour but SAS, PMS and radio problems left much to be desired. This time she was grounded for 30 days. In mid-October she was again test flown but she showed her displeasure with a severe vertical beat. After all, just how long can a lady go without TLC or sweet talk or attention? Any self-respecting gal, accustomed to the finer things of life, gets kind of mean when subjected to four months solitary. On the next test hop she again evidenced her stubbornness by a more than normal beat in a hover so she was landed and taxied back to the line. Fearing that she would be isolated once more and having decided that enough was enough she turned on such a temper tantrum that it was hard to believe. After docilely entering the chocks she planted both feet hard, threw her nose way up (the rear rotors hit the ground) and almost simultaneously the aft pylon began to collapse, the forward and aft blades intermeshed and debris was scattered in all directions. Her reign was ended.

She had been enough of a lady not to hurt anyone else but when the investigation was concluded she had damaged herself enough to be consigned to NARF for overhaul. The AAB and endorsers in the chain of command took her attendants to task for their lackadaisical attitude, improper procedures, breaks in work continuity, sparse training program and weakness in maintenance management. That's NO way to treat a lady!

One Jump Ahead*

TEXAS, a state where everything is big, is also the headquarters of CNAVanTra (Chief of Naval Air Advance Training) where big things are taking place in the field of aviation safety. This progressive organization has recently established a "One Jump Ahead Council." Read on!

All too often our safety efforts are directed toward analyzing *what happened, why the accident, what broke first.* In other words *catch up*. Other aspects of our safety programs are directed at preventive maintenance and are designed to detect possible malfunctions and to ward off impending failure or to detect a potential cause before an accident happens. In furtherance of the latter concept, and to conserve limited assets and precious lives, it is imperative to get one jump ahead of the game.

To do this a "One Jump Ahead Council" has been established with its purpose to get one jump ahead of what potentially is the next accident most likely to occur in the command. The Council will ask itself questions such as:

- What support equipment is most likely to break next?
- What chain fall or overhead equipment is going to fail or fall down?
- What yellow equipment is about to suffer a steering casualty?
- What sprinkler system or fire extinguishing system will not work when needed?
- What unqualified, unlicensed, untrained operator is going to smash the next vehicle?
- What aircraft is going to fall off the wrong jack?
- What unlighted taxiway will be the scene of the next night taxi accident?
- What unswept ramp will cause FOD to the next engine?
- Which traffic patterns are likely to cause mid-airs?
- Which access plate will fly off the next aircraft?
- What practice bomb will fall in a school yard?
- Which student will overrotate on takeoff?

Of course the questions above, for which the Council will try to find answers, are just starters from which proper preventive action can be initiated. The Council will be composed of the ASO, senior flight surgeon, management engineer, maintenance officer and training officer. The "One Jump Ahead Council" will meet weekly to consider these questions and any others brought to its attention. Inputs are solicited from NAVanTraCom activites by Anymouse forms and CNAVanTra Safetygram memos.

Prevention of accidents requires great attention to detail every day. It also requires a conscious effort to develop foresight and to isolate potential troubles, difficulties or accidents *BEFORE* they happen. "One Jump Ahead" can mean a significant improvement in aviation and general safety and is a challenge to all hands to make the progress which we all so earnestly seek.

What is your command doing?

**CNA VanTra message 172140Z March 1970*

MURPHY'S LAW *

A-7B Rudder Cable Misinstallation

AN A-7B pilot experienced stiff rudder pedal movement while checking for control freedom. Investigation revealed that the right hand rudder cable was misrouted around the right hand rig pin ear of the bracket assembly which houses the UHT push-pull tube arm assembly, PN 215-78303-l. The misrouted cable cut a one-inch slit into the former, PN 215-70075-144, before it was discovered.

Even though Murphys such as this may be detected by alert pilots, such misinstallations can be prevented only by careful attention to the job at hand by maintenance personnel. ◄

*** If an aircraft part can be installed incorrectly, someone will install it that way!**

LETTERS

"What we anticipate seldom occurs; what we least expect generally happens."
Disraeli

Wants OPNAVs and Training

FPO, San Francisco – Professional naval aviators should be familiar with all OpNav instructions regarding flying. Admittedly we become familiar with some of these in the training command and most operating squadrons have them for reference. However, our squadron operates detachments and these detachments are not provided with the more important instructions, such as OpNav 3710.7E (NATOPS General Flight and Operating Instructions Manual).

There is considerable pertinent information which we cannot study while on detachment in Vietnam because it is not available. Yet when we resume flying stateside we will be expected to know it all and there is plenty of time here for pilots to study this material.

In order to better prepare us for return to ConUS, I recommend that all detachments be provided OpNavInst 3710.7E and OpNavInst 3750.6F (Navy Aircraft Accident, Incident and Ground Accident Reporting Procedures). Our detachment asked for these but the requests were denied. Furthermore there is no training available for us prior to return to ConUS which would provide a review of stateside flight rules, such as the briefs CVA pilots get. Such lectures should be utilized as review and to inform pilots of changes in flight regulations, etc.

Needy Mouse

• We agree wholeheartedly that you should have all pertinent OpNav instructions as well as those concerning aviation safety reporting procedures. You didn't mention from whom you requested these instructions but we assume that it was your parent squadron. Detachments operating independently are still the parent squadron's responsibility when it comes to logistic and administrative support. If you didn't request it from your command, you should have. We cannot conceive that such a request would be denied.

Squadrons operating detachments, such as HC squadrons for example, should provide their detachments with all the instructions/publications required before deployments. It is also the parent squadron's responsibility to send changes and corrections to the dets so the instructions and publications may be kept current.

In regard to brushing up on flight rules prior to returning to ConUS the best recommendation appears to be individual study and review as well as planned lectures. The most pertinent material would be the FLIP publications, FAR Part 91 and the NATOPS General Flight Manual. If you are still unsuccessful in obtaining the publications you need, let us know and send your address – we will do all we can to help.

VERTREP Problems

Washington, D.C. – This letter is in reference to the Anymouse report on vertrep problems on page 22 of the April 1970 APPROACH.

Evidently the ship in question was not certified for vertrep operation in accordance with NavMatInst 3120.1. In November 1968 OpNavInst 3120.28 established "the requirement that all aviation facilities be formally inspected and certified as providing proper, adequate and safe facilities in naval ships operating aircraft." The NavMatInst, dated 18 June 1969 established procedures and delineated responsibilities for certification of aviation facilities in non-aviation ships. NavAirSysCom, Code 5374, has overall management responsibility for the certification program.

The Anymouse really points out and supports the overall requirement for a certification program and the importance of adhering to established mandatory procedures. I would like to enumerate areas within the letter that are now covered by the certification program and other available publications.

1. "We had very little information on the ship's design and size." NavAirEngCen (Naval Air Engineering Center) report, NAEC 7576, entitled "Non-Aviation Ship Helicopter Facility Resume" is the most comprehensive publication available to provide planners and operators with pertinent information on the facilities provided by non-aviation ships. This initial resume, now being expanded, receives wide distribution and is also available from NavAirEngCen, Code NE, Philadelphia, Pa. 19112. The SPLASH document, published by the Navy Tactical Doctrine Activity, Washington, D.C. 20390, provides similar information in a kneeboard form for use by pilots while in the aircraft.

2. "The drop area was small, clearances were marginal." While the actual size of a drop area is not specified, the clearances required are now a certifiable dimension and are explained in the Helicopter Operating Facilities Bulletin No. 1 also issued by NavAirEngCen.

3. "Rotor wash blew up considerable FOD." NWIP 41-6C, Non-Aviation Ships Helicopter Operations, states in paragraph 200 that the OOD shall ensure that all loose objects on all weather decks are secured prior to helicopter operations. Paragraph 410a(2) of this publication lists many areas to be considered and steps to be taken prior to helicopter operations including securing of loose gear in the transfer area and an inspection of all weather decks for potential flying objects.

APPROACH welcomes letters from its readers. All letters should be signed though names will be withheld on request.

Address: APPROACH Editor, Naval Safety Center, NAS Norfolk, Va. 23511. Views expressed are those of the writers and do not imply endorsement by the Naval Safety Center.

FLIP Changes

The Department of Air Force, Headquarters Aeronautical Chart and Information Center, St. Louis, Missouri has notified the Naval Safety Center of the following changes to FLIP documents:

- Special operating procedures are to be observed with the creation of the Atlanta Terminal Control Area (TCA) effective 25 June 1970. See FLIP Planning N & S America, Section II; Low Altitude Chart – U.S., L-20 and the Atlanta Terminal Area Chart, 25 June 1970.
- New Radar Beacon Codes for VFR flight and the use of Area Navigation equipment will become effective 1 July 1970. See: FLIP Planning, N & S America, Section II, 25 June 1970.
- The FAA has established new Abbreviated IFR Departure Clearance Procedures effective 1 July 1970. See Special Notice in FLIP Planning, Section II, N & S America and the Pacific, Australia and Antarctica Editions, 25 June 1970.
- Effective 25 June 1970, High Altitude – Single Direction Routes will be graphically depicted on the FLIP Enroute High Altitude Charts – US.
- Effective 20 August 1970, DD Form 175 instructions will be revised.

Significant changes have been made to the Stopover Flight Plan Procedures. See FLIP Planning Section II, North and South America.

- As of 23 July 1970, the Military Training Route Charts in Section IIA will be distributed every 12 weeks. The booklet giving textual descriptions will continue to be revised every four weeks. Additionally, Section IIA has been designated as the primary source document for operation planning for the use of All Weather Low Altitude Routes. Concurrently, narrative information on Oil Burner and Heavy Wagon Routes will be removed from the FAA Airman's Manual.

4. "Deck crews are minimally trained in helicopter vertrep." Chapter 6 of NWIP 41-6 lists the minimum mandatory training requirements which shall be met by personnel prior to a ship engaging in helicopter operations.

5. "Certification system would be extremely useful." A mandatory certification program is now in existence. It is being expanded and modified to meet current operational requirements. Applicable references are OpNavInst 3120.28, NavMatInst 3120.1, Helicopter Operating Facilities Bulletin No. 1, Helicopter Support Facilities Bulletin No. 1, NavAirEngCen Report ENG 7576 and SPLASH.

In the past, the non-aviation ship-helicopter interface has been at best a casual operation and in many cases a haphazard one. Today, with more and more types of operations between the helicopter and ship being conducted, a professional approach to the problems is being undertaken. No longer will fleet, type or operational commanders, squadrons and pilots be left entirely in the dark as to facilities available to them. No longer will initiative and "can do" spirit be the only means available to successfully accomplish assigned vital missions.

Safety in helicopter operations conducted with non-aviation ships must and can be a reality when all personnel concerned follow established procedures, utilize existing training facilities and become aware of the certification status of the shipboard facilities.

Howard Ziemer
NavAirSysCom

- **We all realize that these instructions do not constitute the entire answer to the problems encountered in vertrep activities but they most certainly do represent great steps in the right direction. As developments occur and instructions become more definitive, APPROACH will pass the information along. Until then we feel that your letter has summed up the present situation in the certification program, operating procedures and supporting instructions better than any other source we've seen.**

Vol. 16 **approach** No. 3

RADM W. N. Leonard
Commander, Naval Safety Center

Our product is safety, our process is education and our profit is measured in the preservation of lives and equipment and increased mission readiness.

Contents

Departments

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Purposes and policies: Approach, published monthly by the Naval Safety Center, presents the most accurate information currently available on the subject of aviation accident prevention. Contents should not be considered as regulations, orders or directives and may not be construed as incriminating under Art. 31, UCMJ.

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Credits

This month's cover painting by AME3 Steve Anderson dramatically illustrates the all weather capability of the Navy's A-7 at the moment of launch. Painting reproduced courtesy of CDR F. V. Orrik, VA-25. **Pg 28 (Top)** painting by Craig Kavafes, courtesy Grumman Aircraft.

The War of 1969

Adapted from The Travelers 1970 Book of Street, Highway and Interstate Accident Facts

ON page 1080 of *Bartlett's Familiar Quotations,* you will find these words ascribed to William Henry Mauldin. "I feel like a fugitive from th' law of averages."

They constitute, of course, a caption for one of the Willie and Joe drawings that established Bill Mauldin as World War II's outstanding cartoonist. Willie and Joe have long since dropped out of sight. Not Bill Mauldin. His political cartoons, widely syndicated, have earned him prize after prize – including his second Pulitzer.

He, like Willie, feels like a fugitive from the law of averages. You should, too. Crashes on streets and highways have killed and injured millions more Americans than all the wars we have ever fought. The casualty list for just "The War Of 1969" follows:

56,500 deaths – highest in history.

4,700,000 injuries – highest in history.

Speeding was the chief cause.

Drivers under 25 were involved in much more than their share of accidents.

Three out of four people killed or injured were on dry roads in clear weather.

Weekend and after-midnight accidents broke all records.

Casualties in "The War Of 1970" are mounting. If you drive, if you are a passenger or if you are a pedestrian, you are in uniform on the field of battle.

Are you up to the challenge of Interstate Highways? Do you know what "Yield" means? Do you understand the crucial importance of minimum as well as maximum speeds? The danger of blocking the outside passing lanes or of assuming you can hit your directional signal and then change lanes without first looking behind you?

It's another war. Arm yourself with concentration, a defensive attitude and a serious study of the new rules of the road.

Courtesy American Airlines
Maintenance Newsletter


NAVY